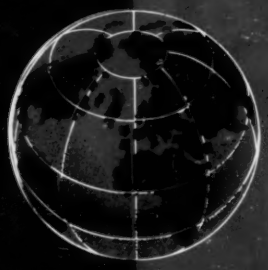
April 25, 1961
One dollar per copy

MINING WORLD



CATALOG, SURVEY & DIRECTORY NUMBER

Blue Pages	Pink Section	Yellow Pages
BLUE RIBBON EQUIPMENT AWARDS for 1960	**DIRECTORY of UNITED STATES MINING COMPANIES**	**INDEX of EQUIPMENT and MACHINERY BUILDERS**
pages 56–62	*pages 147–194*	*pages 231–261*

Technological Advances

Geology and Exploration ▶ 34
Mineral Dressing ▶ 40
European Ore Dressing ▶ 47
Underground Mining ▶ 48
Open Pit Mining ▶ 52

Metals and Minerals Review
Aluminum to zinc ▶ 68

United States Mining in 1960
State-by-state report from Alaska to Wyoming ▶ 88

Iron Ore Range Shipments
by mines for 1958, 1959, 1960 ▶ 96

Open Pit Mine Production
Tons mined and stripped ▶ 99

Underground Mine Production
from 1955 through 1960 ▶ 101

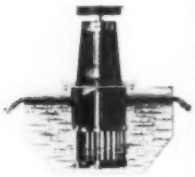
Metals and Minerals
Production by states ▶ 109

World-Wide Mining Reports
Africa-Asia-Caribbean-Europe
The Americas-Oceania ▶ 112

Ore Buyers' Guide
Where to sell your ores ▶ 221

WEMCO World Standards in Mineral Processing...

FLOTATION • HEAVY MEDIA • GRAVITY CONCENTRATION

EQUIPMENT	FEATURES	SPECIFICATIONS
WEMCO MOBIL-MILL	Widely used for profitable production of marketable concentrates and low cost elimination of waste in treating metallic minerals, industrial minerals, coal and aggregate. Pre-engineered and pre-fabricated for maximum flexibility. Incorporates Wemco Drum type and Cone type separators for most accurate separations and highest recoveries.	Specific Gravity Range: 1.25 to 3.40 Capacity: 5 to 500 TPH Separatory Vessel: Cone, Single Drum, Double Drum, 2-Compartment Drum.
 **WEMCO FAGERGREN FLOTATION MACHINE**	World standard of flotation in major operations with maximum capacity per cubic foot of floor space. Rotor-stator principle gives optimum pulp circulation and aeration for high metallurgical efficiency. New air control for increased cleaning efficiency. Special feed boxes eliminate costly pumping. Minimum adjustments.	Sizes: 12" to 66" Capacity: 1 to 50,000 TPD Rotor-Stator: Rubber or neoprene covered, stainless or alloy iron. Tank: Steel, wood, stainless, cement or rubber lined.
WEMCO SPIRAL CLASSIFIER	Slime-sand separations from 28 to 325 mesh. Single, double or triple spirals; tank options from straight side to full flare for desired settling area. Hydraulic lifting device available for starting under load without tank drainage. Sealed bearings, replaceable wearing shoes, continuous welded steel tube shaft assures long life.	Spiral Diameter: 12" to 90" Tank: Length: 6' to 48' Raking Capacity: 5 to 24,000 TPD Wearing Parts: Alloy iron stainless steel or rubber covered.
WEMCO REMER JIG	Ideal for concentration of large tonnages of ores where specific gravity differential exists and ratio of concentration is low. Provides exclusive differential acceleration — combined high and low frequency strokes — with live jig bed over entire surface.	Type: 2 hutch, 3 hutch Sizes: 5'x11' to 5'x16' Capacity: 30 TPH to 60 TPH per unit.
WEMCO AGITATOR-CONDITIONER	For fast, homogeneous agitating, mixing and blending. High intensity Fagergren type mixer-blender for reagents, other material with poor solubility characteristics. Propeller type available for conditioning flotation pulp, reagent mixing or blending. Certain parts interchangeable with Wemco Fagregren Machines. Turbine agitators also available for special applications.	Sizes: High intensity type cell sizes 2 cu. ft. to 100 cu. ft. Propeller type, tank sizes 2' to 20' diameter. Wearing Parts: Alloy iron, stainless rubber or neoprene covered.
WEMCO ATTRITION MACHINE	Efficiently removes stubbornly adhering coatings from mineral particles. Widely used to remove iron from silica sand for glass manufacture. Provides intensive scrubbing action of particle on particle in high density pulps and slurries.	Rubber covered impellers and liners or abrasion resistant steel and ni-hard reduce maintenance to a minimum.

WEMCO PUMPS

WEMCO SAND PUMPS	Handles pulps of sands, abrasive solids, slimes, slurries and heavy media; pumps flotation feed, concentrates and tailings. Used for HMS circuits, screen products and grinding mill discharge to classifiers. Change of wearing parts made readily.	Sizes: 1¼" to 8" Capacity: 20 GPM to 2200 GPM Discharge Head: Up to 100 Ft. Pulps Handled: Up to 65% solids, particles up to 1"
WEMCO VERTICAL SAND PUMPS	Provides performance of Wemco Sand pumps with added vertical application. Used for clean-up duty installed over sump or on cross members without need for separate dry pump pit. Can be mounted inside flotation concentrate launders for pumping concentrates.	Sizes: 1¼" to 4" Capacity: 20 GPM to 500 GPM Pulps Handled: Up to 65% solids, particles up to ¾"
WEMCO TORQUE-FLOW PUMP	New principle incorporates recessed impeller, continuous open passage. Permits pumping of large solids and tramp material in slurry without clogging. Wear is reduced since only small portion of slurry comes in contact with moving parts. Handles slurries with higher solids content than conventional pumps.	Sizes: 2"x2" and 3"x2" to 8"x8" and 10"x8". Capacity: 50 GPM to 2500 GPM Head: Up to 100 ft. Construction: Ni hard for abrasive service.

WEMCO®

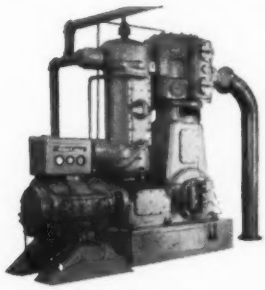
a division of

Western Machinery Company

650 Fifth St., San Francisco 7, Calif.

Which... ATLAS COPCO COMPRESSOR

meets your needs best?



AR Heavy-Duty Compressors

More air per horsepower than any comparable compressor! For continuous, full-load operation. "L" angle, 2-stage, double acting. Water cooled. Standard models provide 382 to 3210 cfm free-air delivery at 100 psi; only 76-590 hp required! (Can be supplied for other working pressures on request.)

What's your compressor requirement? Need an installation large enough to provide air for all your needs? Or would a small, compact unit for auxiliary operation solve your immediate problem? Either way—and for a wide range of applications between these extremes—Atlas Copco has the compressor for you!

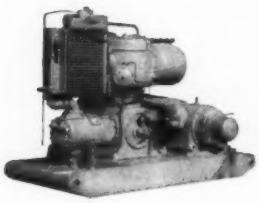
No matter which you choose, you'll get these proven advantages from Atlas Copco:

(1) More air per horsepower—less power consumption than other comparable units!

(2) Really low maintenance (one example — $3.10 after 10,000 hours' operation)!

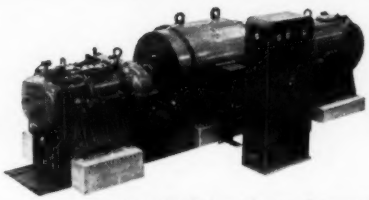
(3) Specifications are guaranteed free-air delivery — you get exactly what you order!

Get all the facts now—and compare! The coupon below will bring you a free catalog. (No obligation, of course.)



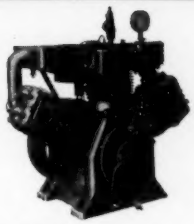
AR-L Heavy-Duty Compressors

Same basic construction as the AR Series, but provided with an air-cooled intercooler and air-cooled radiator for the cylinder water. Fan on compressor flywheel cools radiators. Perfect for arid areas or where difficult to bring in water. Both stationary and skid-mounted models available.



TWIN-AIR Rotary Screw Compressors

Brand new! "Twin-Air" Compressors offer capacities from 6,900 to 19,400 cfm at working pressures up to 115 psi. And, you get completely *oil-free* delivery of air or gas, since no lubrication is required — timing gears maintain small clearances between precision-mounted rotors, eliminating friction (and the necessity of oil) in compression chamber.



CT Air-Cooled Compressors

Stationary, or skid-mounted compressors for use where air demand is between 50 and 300 cfm. Totally air-cooled. Cylinder arrangement designed for smooth, vibration-free operation. Compact, rugged—for continuous, 24-hour trouble-free service. Highly efficient; low on maintenance costs.

ER-6 Heavy-Duty Compressors

New! Fundamental improvements over conventional heavy-duty compressors reduce power requirements (18.3 hp/100 cfm at 100 psi, full load); provide totally enclosed design; and save on floor space. Capacities to 1,140 cfm; standard instruments and safety devices.

ATLAS COPCO
Dept. MWA-60-5, 545 Fifth Avenue,
New York 17, N.Y.

Gentlemen:
Please send me ☐ Short-form catalog ☐ Detailed information on the_____Series

Name_____ Title_____

Firm_____

Address_____

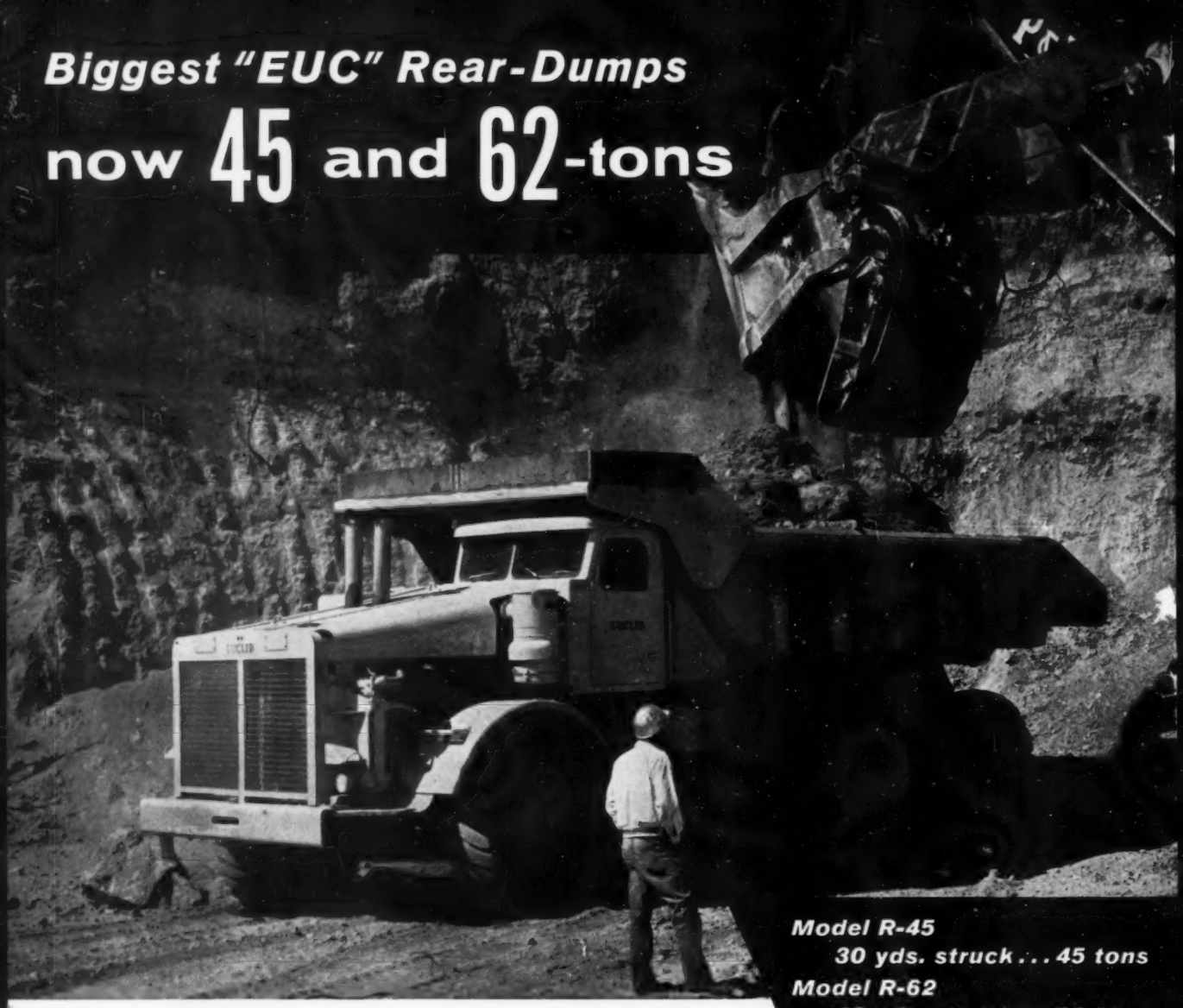
City_____ Zone_____ State_____

Atlas Copco

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

Biggest "EUC" Rear-Dumps now 45 and 62-tons



Model R-45
30 yds. struck . . . 45 tons
Model R-62
40 yds. struck . . . 62 tons

Designed and built for heavy off-highway service in construction, mine, quarry and industrial work, Rear-Dump "Eucs" have paced the industry for over 25 years. Now rated capacities of the two biggest models have been increased to meet field demand for still larger payloads than before.

For work under large loading shovels on the big tonnage, big yardage jobs, check these Model R-45 and R-62 "Eucs". They have payload capacities of 90,000 and 124,000 pounds and replace the widely used 40 and 55-ton models in the Euclid line of rear-dumps.

Use of high strength alloy steel for all body wearing surfaces cuts net weight and increases payload capacity . . . there's no compromise on the rugged durability and performance that "Eucs" are known for throughout the world. And, although they're new in size, both the R-45 and R-62 have years of job-proved dependability since they are of the same design and incorporate the same major components as the well-known models they supersede.

Have your Euclid dealer give you detailed information and show you how these big "Eucs" can cut your hauling costs. Euclid Division of General Motors, Hudson, Ohio

GM GENERAL MOTORS EUCLID

EUCLID

DIVISION OF GENERAL MOTORS, HUDSON, OHIO
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

MINING WORLD

Volume 23, No. 5 April 25, 1961

Catalog Survey and Directory Number

Index of Editorial Content

TECHNOLOGICAL ADVANCES OF THE MINERALS INDUSTRIES IN 1960

Exploration: Geologists Look to Research for Tomorrow's Discoveries 34
Jack A. James
Ore Dressing Industry Seeks More Effective Automatic Controls 40
Adam L. Wesner
European Ore Dressing Stimulated by London Conference 47
Pierre Gy
Mining: Operators Cut Costs by Mechanization, Industrial Engineering 48
Richard M. Stewart and S. W. Hurlbut
Iron Ore Beneficiation — Magnetizing Roasting, Cheaper Grinding, Direct Reduction 54

BLUE RIBBON EQUIPMENT AWARDS FOR 1960

International Judges Pick the 1961 Blue Ribbon Equipment Awards 56
Underground 58-59
Open Pit 53-59
Exploration 60-61
Ore Treatment 60-61
Control and Laboratory Services 62
General Equipment and Supplies 62
Reader Inquiry Card 65

METAL AND MINERAL REVIEW

Aluminum, Walter L. Rice 68
Asbestos, Karl V. Lindell 69
Beryllium, David Hershberger 70
Boron 70
Cobalt, F. R. Morral 71
Copper, Frank J. Tuck 72
Diamonds, A. F. Daily 73
Fluorspar, Delmus F. Cardin 74
Gold, John W. Carrington 75
Iron, M. E. Volin 76
Lead, C. E. Schwab 77
Mercury, J. Eldon Gilbert 77
Minor Metals, John R. Bogert 78
Minor Non-Metallics 79
Molybdenum, George O. Argall, Jr. 79
Nickel, Henry S. Wingate 80
Phosphate, G. Donald Emigh 81
Potash, Thomas W. Childs 82
Silver, J. W. Patterson 83
Sulphur, J. M. Lancaster 84
Tungsten, Russell C. Nelson 85
Uranium, J. W. Barnes 86
Zinc, G. C. Amstutz 87

UNITED STATES MINING IN 1960

Alaska 88
Arizona 88
California 89
Central 89
Colorado 89
Eastern 91
Idaho 93
Lake Superior 95
Montana 95
Nevada 97
New Mexico 98
Oregon 100
South Dakota 100
Tennessee 100
Texas 103
Utah 103
Washington 105
Wyoming 106

IRON RANGE ORE SHIPMENTS 96

OPEN PIT MINE PRODUCTION FOR 1957-1960 99

UNDERGROUND MINE PRODUCTION FOR 1955-1960 101

U. S. MINE PRODUCTION OF KEY METALS FROM 1900 TO 1961 106-107

PRODUCTION OF MINERALS BY STATES 109

WORLD WIDE MINING REPORT

Africa

Algeria 112
Angola 112
Congo Republic 112
Republic of the Congo 112
Ghana 112
Kenya 113
Morocco 113
Mozambique 113
Nigeria 114
Northern Rhodesia 115
Southern Rhodesia 116
South West Africa 117
Tanganyika 118
Union of South Africa 119

Latin America

Argentina 120
Brazil 120
British Guiana 120
Bolivia 121
Chile 121
Colombia 121
Honduras 122
Mexico 123
Peru 124
Venezuela 125
French Guiana 125

Asia

Ceylon 126
Cyprus 126
India 126
Japan 126
Republic of Korea 127
Malaya 127
Turkey 129
Taiwan 131
Thailand 131

Oceania

Australia 132
Fiji 133
Indonesia 134
New Caledonia 134
New Guinea 136
New Zealand 136
Philippines 136

Caribbean

Jamaica 137

North America

Canada 138
Greenland 138

Europe

Austria 140
Eire 140
Federal Republic of Germany 140
Finland 140
France 141
Greece 141
Italy 141
German Democratic Republic 142
Norway 143
Poland 143
Portugal 144
Spain 145
Sweden 145
Yugoslavia 146

DIRECTORY OF U. S. MINING COMPANIES 147

UNITED STATES ORE BUYERS GUIDE 221

CATALOG INDEX OF EQUIPMENT & MANUFACTURERS 231

ADVERTISERS' INDEX 262

EDITORIAL AND EXECUTIVE OFFICES
500 Howard Street
San Francisco 5, California
EXbrook 7-1881

General Manager ..... H. G. Grundstedt
Editor ..... George O. Argall, Jr.
Field Editor ..... John R. Bogert
News Editor ..... M. C. Tracy
Production Manager ..... Janet M. Taylor
Circulation Manager ..... C. C. Baake
Field Circulation Manager ..... C. S. Denny

New York City Office
370 Lexington Avenue
New York 17, New York
Murray Hill 3-9294
District Manager ..... Stanley H. Dayton

Chicago Office
1791 Howard Street
Chicago 26, Illinois
Rogers Park 4-3420
District Manager ..... Fred R. Sargent

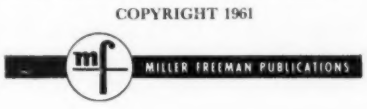
Vancouver, B. C. Office
402 Pender St. West
Vancouver, British Columbia, Canada
MUtual 5-7287
Cable Address: MILFREEPUB
Associate Editor ..... Charles L. Shaw

United Kingdom Office
130 Crawford Street
London, W. 1, England
Cable Address: MILFREEPUB
Director, United Kingdom Operations ..... Bernard W. Lansdowne
Advertisement Manager ..... Derek Hopkins

Continental European Office
28 Attendorner Street
Köln-Merheim
West Germany
Telephone: 87-17-52
Cable Address: MILFREEPUB
Director, Continental European Operations ..... Dr. Walter F. Vogeno

Published by Miller Freeman Publications
Wm. B. Freeman, President
Miller Freeman, Jr., Exec. Vice-President & Treas.

COPYRIGHT 1961



MINING WORLD, April 25, 1961. Volume 23, No. 5. Published monthly except April, when publication is semi-monthly at 10 McGovern Ave., Lancaster, Pa. Executive, advertising and editorial offices, 500 Howard Street, San Francisco 5, California. Subscription in United States, North Central and South America $4.00 per year; other countries, $5.00 per year. Second class postage paid at Lancaster, Pa. Postmaster, please send notice 3579 to MINING WORLD, 500 Howard Street, San Francisco 5, Calif.

OPEN PIT OR UNDERGROUND — PUT POWER WHERE YOU NEED IT

POWER above ground or at the face—for shuttle cars, hoists or shovels... lighting or communication...tools or blasting—wherever you want power in a mine, think of General Cable first! It's the world's most complete line of wire and cable—and you'll find ample stocks near every mining center. For power where you want it, when you want it — rely on General Cable Corp., 730 Third Avenue, New York 17, N. Y.

GCC GENERAL CABLE CORPORATION

CABLE FOR ANY MINING APPLICATION! ■ Super Service power cables ■ Borehole cable, armored or non-metallic armored ■ High-voltage shielded power cable Portable cable, 600V rating, 3/C or 4/C, Type G, PG, PCG ■ Portable cable, 600V rating, Type W ■ Blasting wire and shot firing cord ■ Communication products

Engineered pumping of abrasives corrosives acids

INTERCHANGEABLE

HYDROSEAL
operates with sealing liquid

Brochure No. 457

Split-Shell SLURRY and SAND Type
2" to 14"

Brochure No. 557

CENTRISEAL
delivers the pulp undiluted

PACKLESS Pumps

No stuffing box
No packing
No mechanical seal
No liquid seal
No exposed metal parts

Capacity range: 25 to 800 GPM

Brochure No. 857

Flex-Check Valves
RUBBER-LINED

For pipe diameters up to 12"
For solids up to ¼"

Brochure No. 957

RUBBER-LINED PUMPS

HYDROSEAL
VERTICAL
sump pump

Brochure No. 757

RUBBER-LINED or ALL-METAL,
Four sizes: 1½" to 6"
Slurry, Sand & Dredge

METAL PUMPS

Brochure No. 357

To have an easy key to the correct type and size of pump, write us for "Technical Data" Brochure No. 357. For information in the category of your need, use the specified number. In the refinements of application, our engineers can help you.

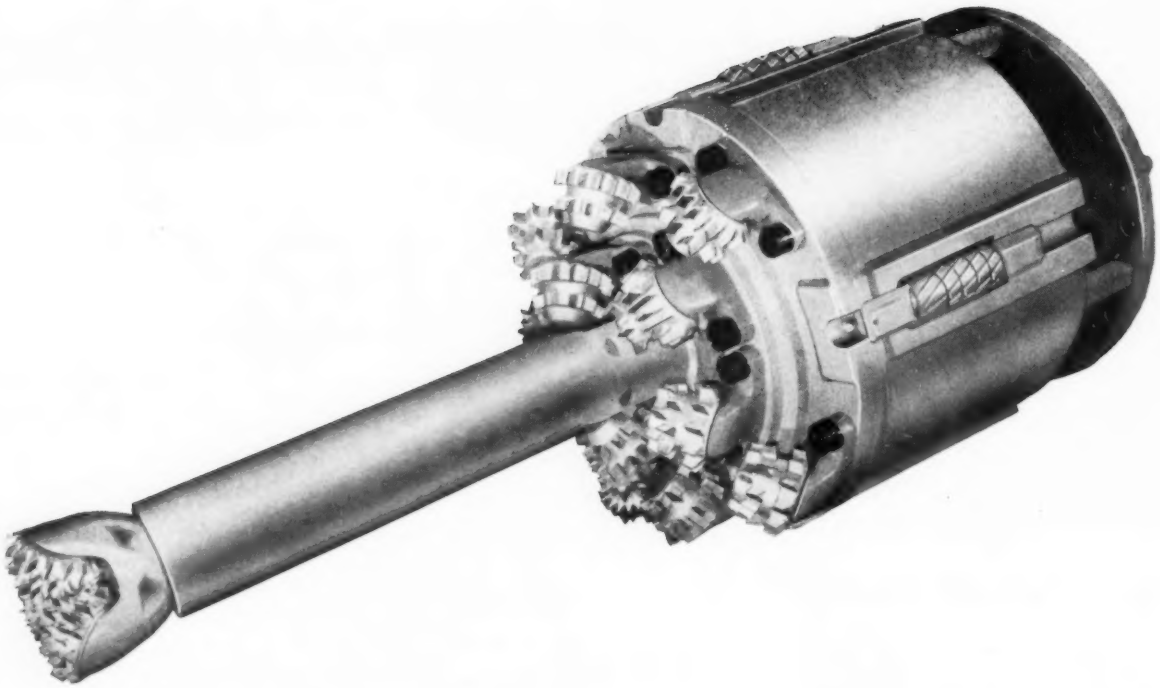
HYDROSEAL SAND and DREDGE Type

Capacities up to 14,000 GPM
Efficiency up to 75%
1½" to 14"

Brochure No. 657

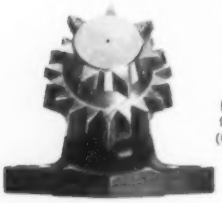
THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. J—P.O. Box 635, Paoli, Pa.
Representatives throughout the World

HYDROSEAL and CENTRISEAL
SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED



HUGHES *Shaft Cutters*

put the "bite" in big bits

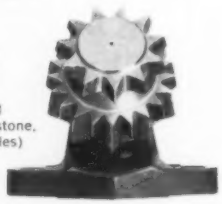


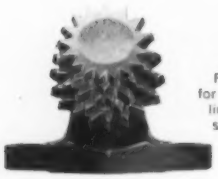
Type **S**

Formerly type SCS
for soft formations
(Calcite, shale, clay)

Type **M**

Formerly type SCM
for medium rock (Limestone,
sandstone, sandy shales)



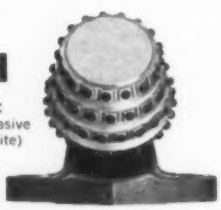


Type **H**

Formerly type SCH
for hard rock (Siliceous
limestone, dolomite,
sandstone, granite)

Type **HH**

Formerly type RSC
for extremely hard abrasive
rock (Taconite, quartzite)



Shown above is a 44-inch bit which gets its bite from cone type cutters developed and manufactured by Hughes Tool Company. Bits equipped with Hughes cutters are now being used to successfully sink shafts from 2½ feet to 7½ feet in diameter — to depths of several hundred feet. Shafts up to 15 feet in diameter have been drilled on an experimental basis.

Where the rotary method of sinking shafts has been used, results have proved this method of drilling significantly more efficient and economical. Drilling costs are lower, the hole is uniform and clean, and time required is far less than for conventional methods.

Hughes manufactures a complete line of cone-type replaceable cutters, each specifically designed for a particular range of formations. The superior performance built into each Hughes shaft cutter is a direct result of Hughes' more than 50 years of specialized rotary drilling experience.

For more information about the rotary method of drilling large diameter holes, contact your Hughes representative, or Hughes Industrial Products, Hughes Tool Company, Houston, Texas.

HUGHES
industrial products
HUGHES TOOL COMPANY • HOUSTON, TEXAS

MANUFACTURERS OF "ROTA-BLAST" ROCK BITS FOR BLAST HOLE DRILLING

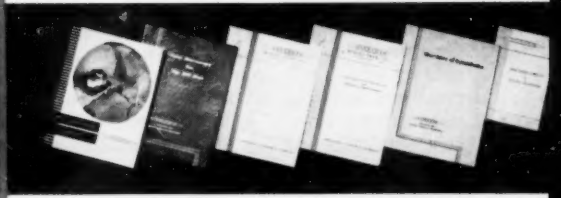
CYANAMID SERVES WORLD MINING OPERATIONS

. . . the widest range of reagents available from a single source

. . . practical, in-the-mill assistance in their use

plus a continuing supply of technical information!

AEROMINE® Promoters • AEROFROTH® Frothers • SODIUM Cyanide
AERO® Brand Cyanide • AEROSPRAY® 52 Binder • AEROFLOAT® Promoters
400, 700 and 800 Series AERO® Promoters • SUPERFLOC 16® Flocculant
500 Series AERO® Depressants • AEROFLOC® Reagents • AERO® Xanthates
AEROSOL® Surface Active Agents • CYQUEST 40® Sequestering Agent



CYANAMID

AMERICAN CYANAMID COMPANY
EXPLOSIVES AND MINING CHEMICALS DEPARTMENT

CYANAMID INTERNATIONAL — *Mining Chemicals Department*
Cable Address: — Cyanamid, New York

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

CYANAMID DE MEXICO, S.A., *Mexico 1, D.F., Mexico* • **CYANAMID OF CANADA LIMITED**, *Montreal, Quebec* • **CYANAMID (FAR EAST) LTD.**, *Yuraku-Cho, Tokyo, Japan*
CYANAMID INTER-AMERICAN CORPORATION, *Lima, Peru* • **SOUTH AFRICAN CYANAMID (PTY.) LTD.**, *Johannesburg, Union of South Africa*
CYANAMID AUSTRALIA PTY. LTD., *Melbourne, Australia* • **CYANAMID OF GREAT BRITAIN LTD.**, *London W.C. 2, England*

Deep Hole Drills
Drifters
Air Feed Leg Drills
Sinkers
Stopers
Broaching Drills
Chain Feeds
Screw Feeds
Hydraulic Drill Booms
Hydraulic Drill Positioners
Remote Drill Controls
Jumbo Components
Jumbo Carriages
"Air Trac"® Crawler Drills
"Mole-Drils"*
Carburized Drill Steel
Couplings
Ring Seal Shanks
Mine Car Loaders
Columns
"Airslushers"
Stationary Compressors
Rotary Portable Compressors
Grout Pumps
Slurry Pumps
Dewatering Pumps
Impact Wrenches
Air Maintenance Tools
Air Hoists
Bit Grinders
Oil Forges
Air Line Oilers
Drill Steel Sharpeners

In step with modern mining needs —GARDNER-DENVER

Why is Gardner-Denver so often first choice in mining properties throughout the world? Over the years Gardner-Denver engineers and mining men have worked side by side. Their combined know-how, experience and resources have led to the development of equipment for use in every type of rock and ore—safer, more productive equipment that meets the need of modern mining in open pit and underground.

That's why—time and again—penetration rates go up and costs per foot of hole come down when Gardner-Denver drills and drill steel are used . . . why Gardner-Denver mine car loaders, drilling equipment, pumps and compressors are favorites among mining men everywhere.

At Gardner-Denver there's no substitute for men—our 100-year philosophy of growth. See your Gardner-Denver mining specialist soon.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Ill.—Offices in principal U.S., Canadian and Mexican cities.
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario.

International: Gardner-Denver International Division, 233 Broadway, New York 7, N. Y.
Offices: Buenos Aires, Argentina; Artarmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal.

in uranium ore processing...

TRONA®
SODIUM CHLORATE!

out-performs other oxidizing agents
because of higher oxidizing power,
economy and ease of handling

Experience proves that TRONA SODIUM CHLORATE is the best oxidizing agent you can use in the acid-leach process for recovering uranium values from its ores. $NaClO_3$ is more economical, too, because of its higher oxidizing power. It is rapidly and completely soluble; in the leaching circuit it forms a solution, not a suspension. Another advantage—Trona sodium chlorate shipping drums are suitable for re-use in shipping yellow cake. AP&CC, the largest domestic producer of sodium chlorate, has the knowledge, experience and facilities to produce a consistently better sodium chlorate for your milling operations.

TRONA® SODA ASH is used in acid and alkaline processes for the refining of uranium ores and as a pH modifier in the ore milling circuit. High quality Trona soda ash has applications also in the refining of lead dross and as an extractant of nonferrous minerals from low percentage ores by flotation.

Write for $NaClO_3$ facilities, technical data and applications bulletin. Also available —an attractive and functional wall chart for chlorate handling precautions.

TRONA

American Potash & Chemical Corporation

3000 WEST SIXTH STREET, LOS ANGELES 54, CALIFORNIA
99 PARK AVENUE, NEW YORK 16, NEW YORK
Sales Offices: LOS ANGELES, NEW YORK, CHICAGO, SAN FRANCISCO, PORTLAND (ORE.), ATLANTA, COLUMBUS (O.), SHREVEPORT

Producers of: BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM • BROMINE • CHLORATES • PERCHLORATES • THORIUM
YTTRIUM • RARE EARTHS • *and other diversified chemicals for Industry and Agriculture*

A New Look at VARIAN'S MAGNETOMETER FAMILY

The "Proton Free Precession" types find diverse applications; an "Optical Pumping" instrument extends research capabilities.

The simplicity, ruggedness and absolute accuracy made possible by Russell Varian's "Proton Free Precession" concept has made **proton** magnetometers the world standard in less than a decade. Using this principle, total magnetic intensities are quickly measured, without critical orientation or calibration requirements. Recent application of the "Optical Pumping" concept has enabled Varian Associates to develop a **rubidium vapor** magnetometer, with the highest sensitivity available today. This new instrument measures total magnetic intensities on a continuous basis.

OBSERVATORY

Varian's V-4931 Modular Station Magnetometer **(proton)** is a highly versatile and accurate monitor of the earth's magnetic field. Strip-chart analog records and digital readout are supplemented by printed-tape output which may be engaged, as desired, to provide permanent digital records. The V-4934 Station Magnetometer **(rubidium vapor)** is particularly suitable for measuring and recording geomagnetic micropulsations.

PORTABLE

The Varian M-49, a complete **proton** magnetometer weighing less than 20 lbs., furnishes direct readings in gammas every six seconds. Sensitive to better than ±10 gammas, it requires no calibration or levelling and is so versatile it can make equally accurate field records from surveys on land, in the air, or over water. Eight plug-in tuner ranges, equally spaced from 19,000 to 101,000 gammas, allow operation throughout the world.

AIRBORNE

The V-4914 Airborne Magnetometer **(proton)** is a rugged, lightweight and compact version of Varian's Station Magnetometer. Sensitivity and accuracy are of observatory quality. Coarse- and fine-scale strip-chart records may be supplemented with punched-tape. The virtually indestructible "bird" contains no mechanical or electronic parts. Varian's V-4914 is easily accommodated in single-engined aircraft. Range: 22,500 to 73,400 gammas.

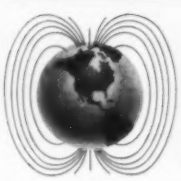
OCEANOGRAPHIC

An accessory "fish" towed up to five hundred feet astern of the hydrographic vessel is the sensing adjunct to Varian's V-4931 for oceanographic survey work. Suitable for broad-scale undersea mapping or offshore geophysical exploration, it furnishes information of observatory quality. Analog and digital readout and records, accuracy and operating range are identical to the observatory model.

RESEARCH

Examples of current projects in Varian's research and engineering laboratories include **proton** and **rubidium vapor** miniaturized magnetometers stressed for missile, satellite, and deep-space applications and instruments being developed for specific military applications, such as ASW. Varian's practical contributions to magnetometry are continuing to advance the state of the art.

For further information on magnetometer sales or leases in many countries of the free world — For loan of the Varian 16 mm color and sound movie on proton magnetometry — For copies of Varian's new Geophysics Technical Memorandum Series — call, wire or write Instrument Division



VARIAN associates
PALO ALTO 65, CALIFORNIA

NMR & EPR SPECTROMETERS, MAGNETS, FLUXMETERS, GRAPHIC RECORDERS, MAGNETOMETERS, MICROWAVE TUBES, MICROWAVE SYSTEM COMPONENTS, HIGH VACUUM EQUIPMENT, LINEAR ACCELERATORS, RESEARCH AND DEVELOPMENT SERVICES

McLANAHAN EQUIPMENT

for Mines, Pits and Quarries

Widely recognized as standards of efficiency and dependable service, McLanahan equipment is on duty the world over.

Other McLanahan Equipment Not Illustrated

- Conveyors
- Dry Pans, Super Heavy Duty
- Elevators
- Super Black Diamond and Pioneer Crushers
- Portable and Semi-Portable Crushing Plants
- Scrap Bundlers
- Mixers and Blenders
- Special Machinery

Descriptive bulletins are available on the equipment shown here. Write for copies today.

McLANAHAN & STONE CORPORATION

HOLLIDAYSBURG, PENNSYLVANIA

PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1835

YOU CAN KEEP THIS END BIT ON THE BLADE 2 TO 3 TIMES LONGER

Our Simplex Dipper Teeth proved so successful that we decided to make end bits out of the same material. (It's Amsco "CS"—a specially heat treated alloy steel.)

Dozing in dirt, sand or rock, operators say our end bits are lasting 2 to 3 times longer than bits made of other materials. They hold a sharp edge until completely worn out—not just partly worn. And they're very tough to bend or break.

Suggestion: First chance you get, order a set of Amsco End Bits from the nearest Amsco Dealer. If you don't know who he is, write us, and we'll send you his address plus a copy of the Amsco End Bit Buyer's Guide.

SEND FOR THIS END BIT BUYER'S GUIDE

AMERICAN Brake Shoe COMPANY

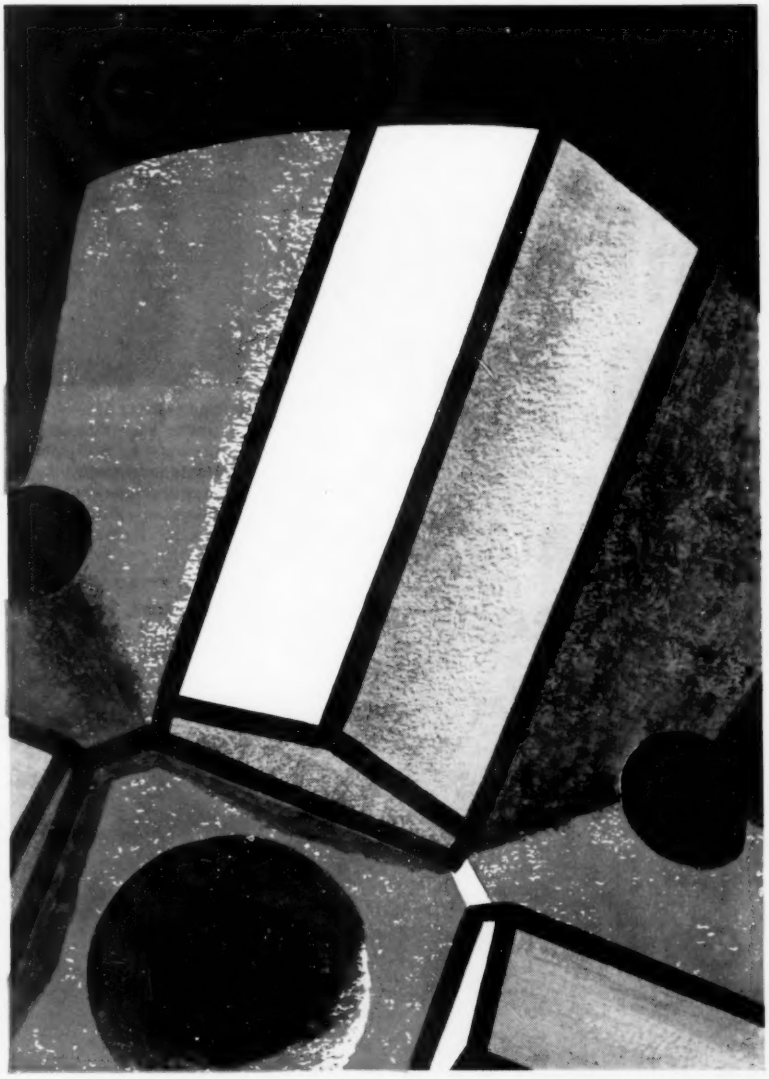
AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other Plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California St. Louis. *In Canada:* Joliette Steel and Manitoba Steel Foundry Divisions

LONGER BIT AND INSERT LIFE

MORE HOLE PER-BIT



TO get lower cost per foot of hole drilled switch to the Timken® carbide insert bit—now improved to cut your drilling costs even more. One big improvement comes from our brazing process. It bonds the carbide inserts firmly to the bit body for greater shock-resistance. Inserts and bits last longer.

Another advance comes from improvements in our heat treating process. Experience helps us produce bit bodies of more uniform hardness and structure. Result is greater strength, practically eliminating ring-off and breakage.

More savings come from Timken bits' field-proven features. The 5 front hole design, pioneered by the Timken Company, directs air or water against the rock face, speeds chip removal. The deeper, wider wing clearance helps chips wash back faster.

With Timken bits you get on-the-job service, the kind you can't get anywhere else. Get full details about the complete line of Timken bits. Send for free brochure, "Timken Removable Rock Bits". The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

TIMKEN®
removable rock bits

FOR OTHER TOUGH DRILLING JOBS

ALL-STEEL MULTI-USE

This improved Timken bit gives lowest cost per foot-of-hole in ordinary ground, when you can drill out full increments of steel.

TAPERED SOCKET BIT

Has same money-saving features as threaded bit. Secure union gives strength of one-piece steels.

How THE BROAD H-R LINE can match your needs exactly...

scalping
sizing
dewatering
washing
feeding
conveying
shaking out

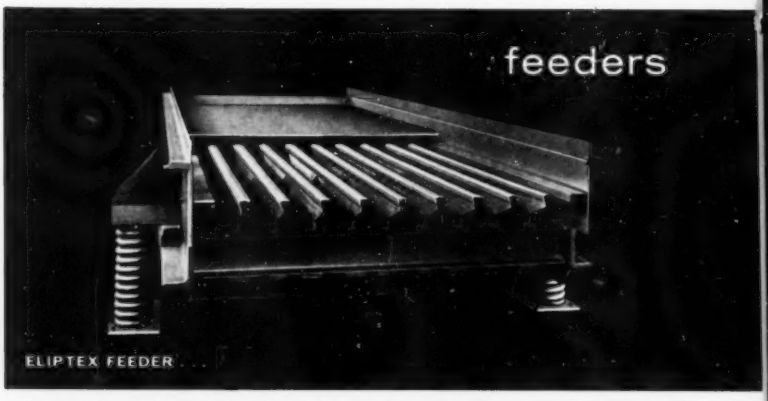
YOUR H-R FIELD ENGINEER CAN SHOW YOU HOW...

* VIBREX SCREENS . . .

Sharp sizing at low cost. Two-bearing, "circle-throw", originated by H-R, is simple and effective. Changing stroke, speed, or angle for different conditions can be easily done in field by your own men. Latest design techniques result in balanced design of all components. Full-floating principle gives smooth, quiet operation. Trunnion yoke and coil spring supports effectively eliminate vibration. Floor-mounted or suspended. Sizes: from 2' x 4' to 8' x 24'. **Bulletin 122D.**

***HIGH SPEED VIBREX . . .**

Fine sizing, washing and dewatering at openings from 10 to 100 mesh. Oil lubricated vibrator has 1/64" thru ¼" stroke range at speeds to 3600 rpm. Adaptable for wide range of materials. Sizes: 3' x 7' and 4' x 7'.



ELIPTEX FEEDER . . .

Extra heavy-duty feeder can be combined with scalping by addition of adjustable opening grizzly bar section. Only two main parts: the vibrator and a one-piece pan weldment with or without grizzly section. Variable feed control conveys material from 0 to full capacity. Low discharge height increases conveyor belt life. Coil springs absorb all impact forces. No daily maintenance. Sizes: from 2' x 4' (light duty) to 6' x 30' (heavy duty). **Bulletin 169A.**

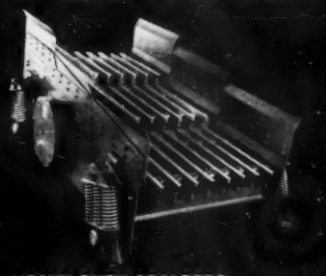
VIBRATING CONVEYORS . . .

Smooth, dependable conveying of practically any material over longer distances for less cost, because Hewitt-Robins balanced vibration principle uses less horsepower than other makes of similar length and capacity. Sizes: from 8" pan width (light duty) to 48" pan width (heavy duty). **Bulletin 135A.**

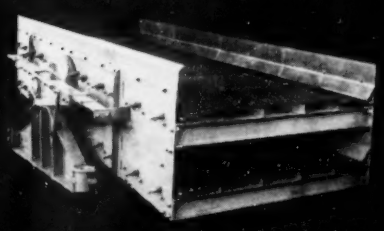
His authority? Over 13,000 Hewitt-Robins vibrating screens, feeders, conveyors and shakeouts are operating in all parts of the world. From this outstanding experience Hewitt-Robins has learned how to design and manufacture vibrating equipment low in upkeep and high in reliability and economy.

An H-R field engineer or distributor is near you. Give him a call or write Hewitt-Robins, Stamford, Connecticut.

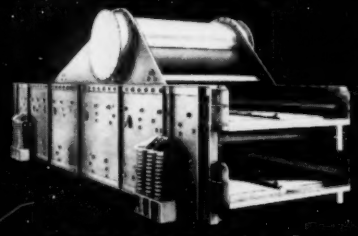
EQUIPMENT . . . screens dewaterizers



HEAVY DUTY SCALPERS . . .



* GYREX SCREENS . . .



* ELIPTEX SCREENS AND DEWATERIZERS . . .

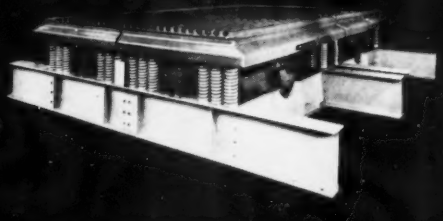
Massive, heavy, rugged. Handles 10,000 lb lumps and up to 54″ cubes dropped 7 feet at openings from 2″ to 14″. Heavy grid frames supported on deep section I-beams with cast steel, perforated plate or grizzly bar decks. ½″ thick 24″ high skirtboards. Multiple corner coil spring mounting absorbs impact and vibration. Sizes: from 3' x 6' to 8' x 20'. **Bulletin 131.**

Smooth operating, positive stroke vibrating screen with a long operating life. High capacity assured by central vibrator location and easy angle adjustment. Wide range of sizes and styles with one, two, or three decks. Floor-mounted or suspended. Sizes: from 4' x 6' to 6' x 16'. **Bulletin 115B.**

With three-way elliptical motion, sizes, washes, dewaters a wide range of materials with high accuracy and efficiency. Horizontal installation saves space, power, machinery. Special alloy, forged, self-counterweighted, full-width shafts; premium helical gears; full-floating vibration. Low power requirements. Single, double or triple deck units. Floor-mounted or suspended. Sizes: from 3' x 8' to 8' x 24'. **Bulletin 162.**

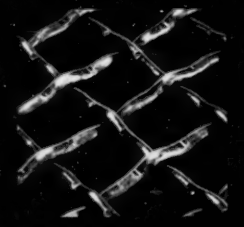
******All screens available with patented Tension Wedge Outfit.* **Bulletin D-145.**

shakeouts deck preparations



FLOATEX FOUNDRY SHAKEOUTS . . .

CAR SHAKEOUTS . . .



DECK PREPARATIONS . . .

Full-floating principle puts entire load on heavy-duty springs. Less horsepower needed. No live load impact on drive shaft or bearings. No escaping vibration; no damage to supports. Many models and styles available, including self-discharging. From 250 lbs capacity to 100 tons capacity. **Bulletin 124C.**

Reduce from hours to minutes time required to unload bottom dump rail cars. Two main types available: *overhead units* for heavy-duty or general service to unload as few as two cars a day. *Trackside car shakeout:* single unit is designed to unload from one car per week to 8 cars/day. Handles *covered* cars, too. All types push-button-controlled for SAFETY. Require only *one operator.* **Bulletins 163 and 172.**

We offer <u>all</u> types: woven wire cloth: high tonnages, accurate sizing made possible by precision weaving and metallurgical control. Wide variety of sizes, weaves, and materials . . . **Non-woven preparations:** *perforated plate* in wide variety of materials. Stainless steel profile wire decks of integral panel construction. *Rod decks* of exclusive "Cog-rod" (snap-in) construction or "Loose-rod" construction. *Grizzly decks* with exclusive Vari-grid (movable-bar) design, with cast manganese bars. Immediate shipment from stock on many specifications.

WRITE FOR TECHNICAL BULLETINS.
Complete descriptive and application data available. Write today!

HR HEWITT-ROBINS

Conveyor Machinery and Belting • Power Transmission Hose • Vibrating Equipment • Engineering Services

HEWITT-ROBINS
DEPT. **66**, STAMFORD, CONNECTICUT

Gentlemen:

Please send me the following bulletins at no charge:

☐ 115B ☐ 122D ☐ 124C ☐ 131 ☐ 135A ☐ 162 ☐ 163 172 ☐ 169A ☐ D145

Signed_____ Title_____

Company_____

Address_____

SINCE 1896

THE NATION'S LEADING INDUSTRIES HAVE TALKED TO TREADWELL

IF YOU ARE PLANNING

... A NEW PLANT
... PLANT EXPANSION OR ALTERATIONS
... NEW MACHINERY AND EQUIPMENT

. . . you'll find that **TALKING TO TREADWELL** pays extra dividends in efficient planning and precision engineering. Whether your plans are long-range or set for immediate action, call or write for a consultation with **TREADWELL.**

M. H. TREADWELL COMPANY, INC.
149 CEDAR ST. NEW YORK 6, N. Y. ■ WOrth 4-3344
SALES OFFICES:
1015 Farmers Bank Building, Pittsburgh 22, Pa.
208 South La Salle Street, Chicago 4, Illinois
SALES REPRESENTATIVES:
Shook & Fletcher Supply Company
1814 First Avenue North, Birmingham, Alabama
R. A. Ashby, 7 Live Oak Way, Kentfield, Calif.

TREADWELL
ENGINEERING AND DESIGN SERVICES

COST STUDIES — PRELIMINARY ENGINEERING — COMPLETE ENGINEERING AND DESIGN SERVICES FOR ■ ORE DRESSING & MINERALS BENEFICIATION, METALLIC & NON-METALLIC ■ ELECTROLYTIC PLANTS ■ BULK MATERIALS HANDLING ■ SMELTING & REFINING ■ NON-FERROUS FABRICATING PLANTS ■ POWER GENERATION ■ COMPLETE INDUSTRIAL INSTALLATIONS

TR 49

Manufacturers of Hot Metal Cars, Cinder & Slag Cars, Ladle Transfer Cars, Smelting & Refining Equipment.

In 20 Anaconda ball mills...

Ni-Hard liners are good to the last ¼ inch... cut mill downtime, cut mill costs

To save thousands of hours of downtime ...thousands of dollars in repair and replacement costs...that's why The Anaconda Company installed Ni-Hard* nickel-chromium-iron alloy liners in twenty ball mills grinding abrasive copper ore.

The proof is in the picture. The worn liner on the far right shows you how Ni-Hard liners keep their contour right down to the last fraction of an inch. That's because Ni-Hard liners not only have outstanding resistance to abrasive wear but also have a uniform wear rate so that you get higher efficiency and longer working life out of the design of your Ni-Hard liners.

Try a set of Ni-Hard liners in your mills. Just contact the Ni-Hard producing foundry in your area. They'll be glad to discuss the design characteristics best-suited for the liners in your mills, glad to give you further information on Ni-Hard liners and how they can help you cut mill-operating costs.

For further information on Ni-Hard iron feed spouts, pipe elbows, and many other parts where abrasion-resistance is required, just drop a note to Inco. We'll send you your free copy of the useful 58-page booklet, "Engineering Properties and Applications of Ni-Hard" and a list of Ni-Hard producing foundries.

**Registered Inco Trademark*

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

NI-HARD

NICKEL MAKES CASTINGS PERFORM BETTER LONGER

139,500,000 LOW-COST TONS!

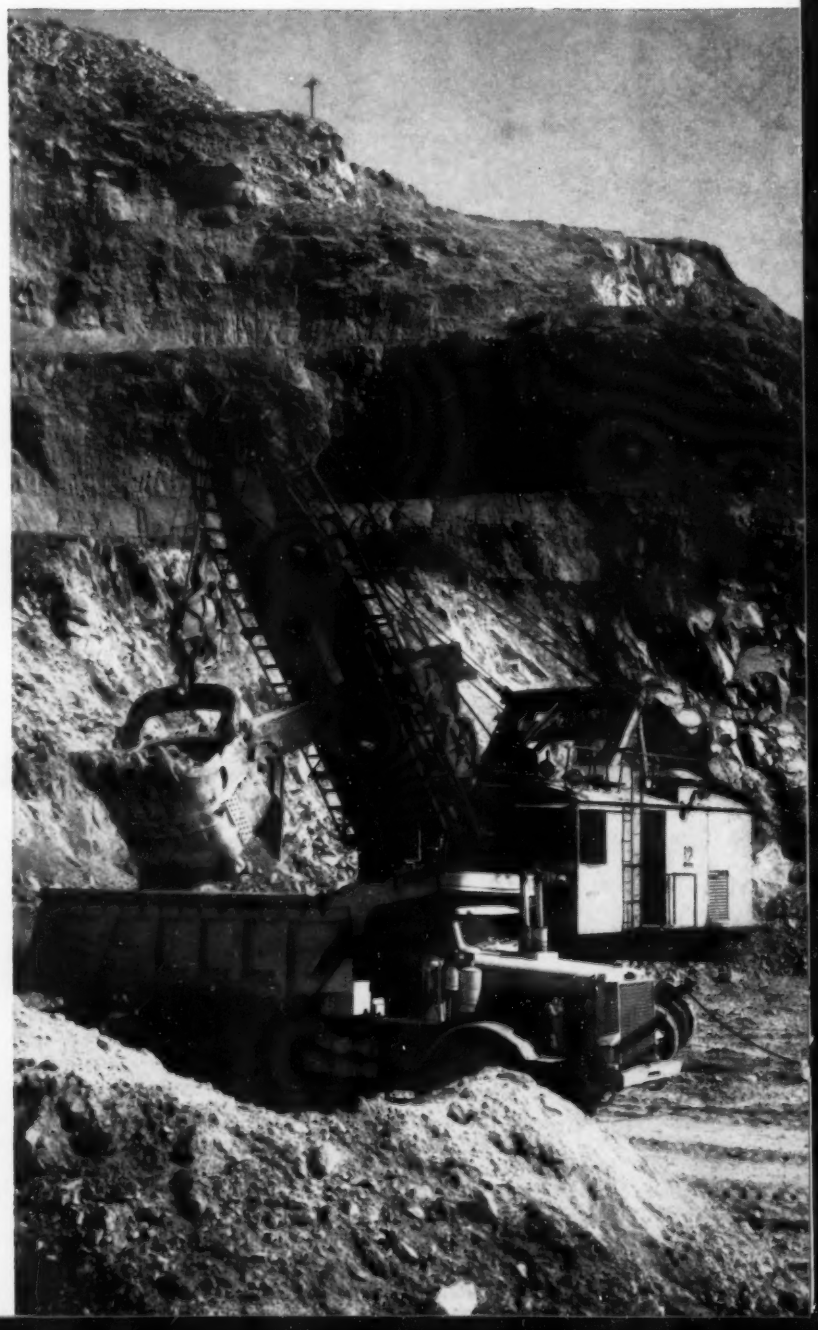
It is a documented fact that three Marion shovels have loaded more than 139,500,000 tons for the Miami Copper Company in the last 16 years.

This evidence of long machine life and dependability in continuous heavy-duty digging is only one side of the story of Marion mining shovels.

Today, new designs, new materials and new sizes of Marion mining machines are writing new chapters of low-cost, dependable efficiency.

Get the cost and output figures — not for just a day, but for years — and you will see why steady, low-cost tonnage, year after year, starts with

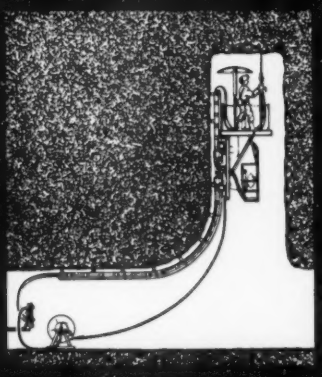
MINING MACHINES BY MARION



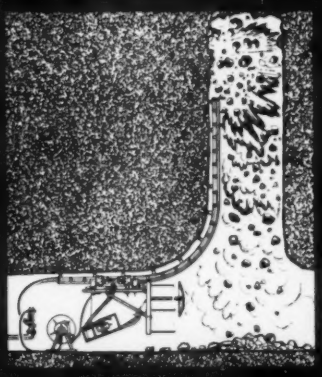
MARION POWER SHOVEL COMPANY

MARION, OHIO

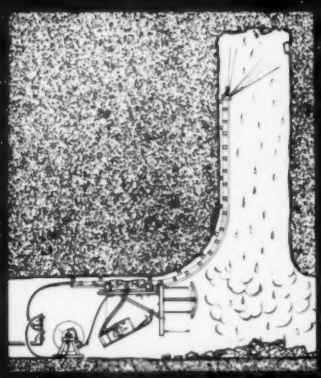
A Division of Universal Marion Corporation



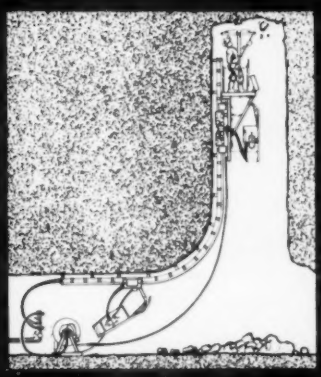
DRILLING



BLASTING



CLEANING



SCALING

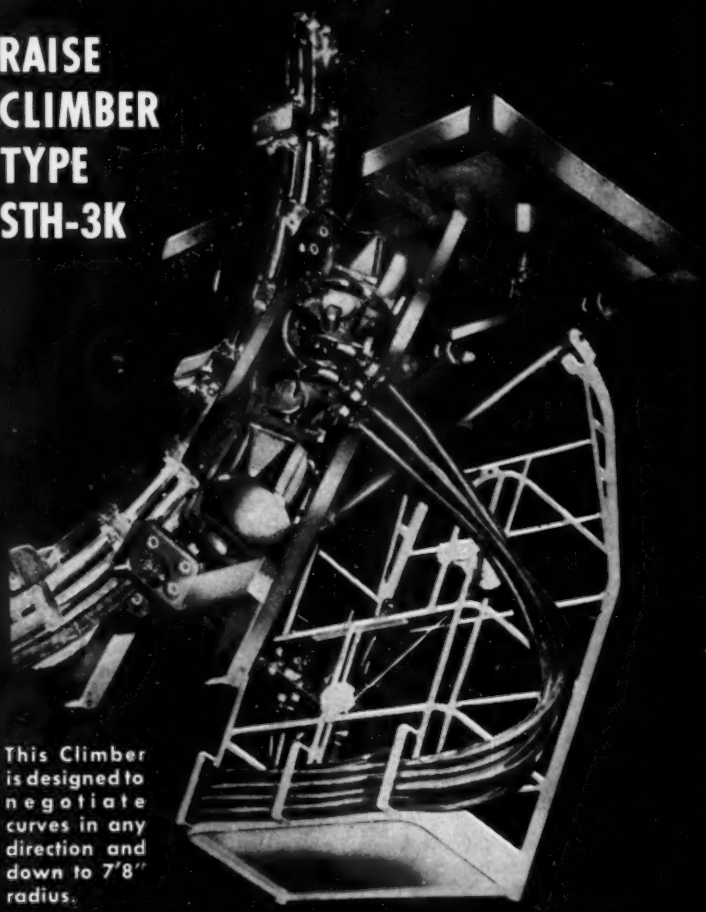
THE ALIMAK SYSTEM FOR RAISE DRIVING

Faster: Get the crew and their equipment up in the raise without loss of time. Timbering is not necessary.

Cheaper: Raise costs in many mines have been cut by 30% to 50%.

Safer: The crew is well protected from falling rock. Less risk of gases in the raise.

RAISE CLIMBER TYPE STH-3K



This Climber is designed to negotiate curves in any direction and down to 7'8" radius.

VERTICAL RAISES
INCLINED RAISES
CURVED RAISES
STRAIGHT RAISES

You can drive them all at great heights **FASTER . . .**

ALIMAK CORPORATION
913 Airport Blvd. · South San Francisco, California
JUno 3-2666

PHONE: SCRANTON, PENNSYLVANIA

DIAMOND 4-8506

FOR ALL YOUR

DIAMOND DRILLING NEEDS...

EQUIPMENT ... AND ...
CONTRACT DRILLING SERVICES

MACHINES

A complete line of core drilling machines ranging from the portable Super-Pioneer to the truck mounted 142-C. Rugged construction ... accurate machining ... constant technological progress assure you a modern drill with a long trouble free life, even under the most difficult operating conditions.

EQUIPMENT

Top quality raw materials ... constant quality control in manufacturing ... careful handling assure you of the best in rods, core barrels, casing and other core drill accessories. On standard items there is ample stock ready for fast delivery to you.

"ORIENTED" DIAMOND BITS

Four matrices ... three grades of diamonds ... seven ranges of stone size. Out of the many combinations possible, there is the right bit for your particular job. Give us all of the particulars and we will assist you in choosing the bit we believe best suited for your work.

CONTRACT DRILLING SERVICES

The most modern core drilling equipment ... highly trained drill crews ... expert supervision ... and the drilling "know-how" accumulated throughout our more than 77 years of experience are your assurance of a core drilling job well done.

When you think of diamond drilling ... equipment or contract services ... remember to phone Scranton—DIAMOND 4-8506.

SPRAGUE & HENWOOD, Inc.

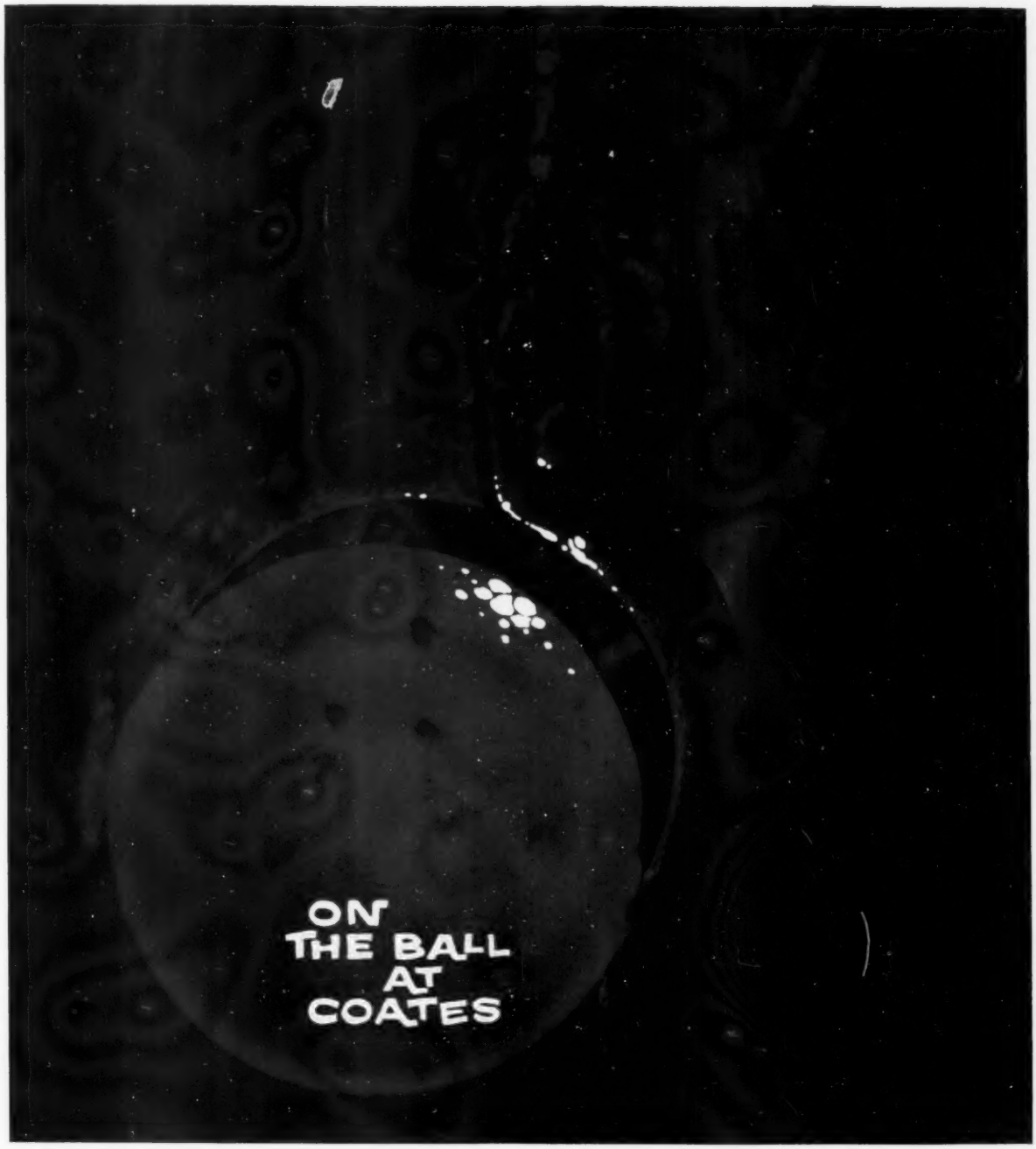
S&H

SCRANTON 2, PA.

Member: Diamond Core Drill Manufacturers Association

Branch offices: New York • Philadelphia • Pittsburgh • Nashville • Grand Junction, Colo. • Tucson • Buchans, Newfoundland

Export Division: Sprague & Henwood International Corporation, 11 W. 42nd St., New York, N.Y.



Write for prices . . . All sizes ½" to 5" carried in stock for immediate shipment.

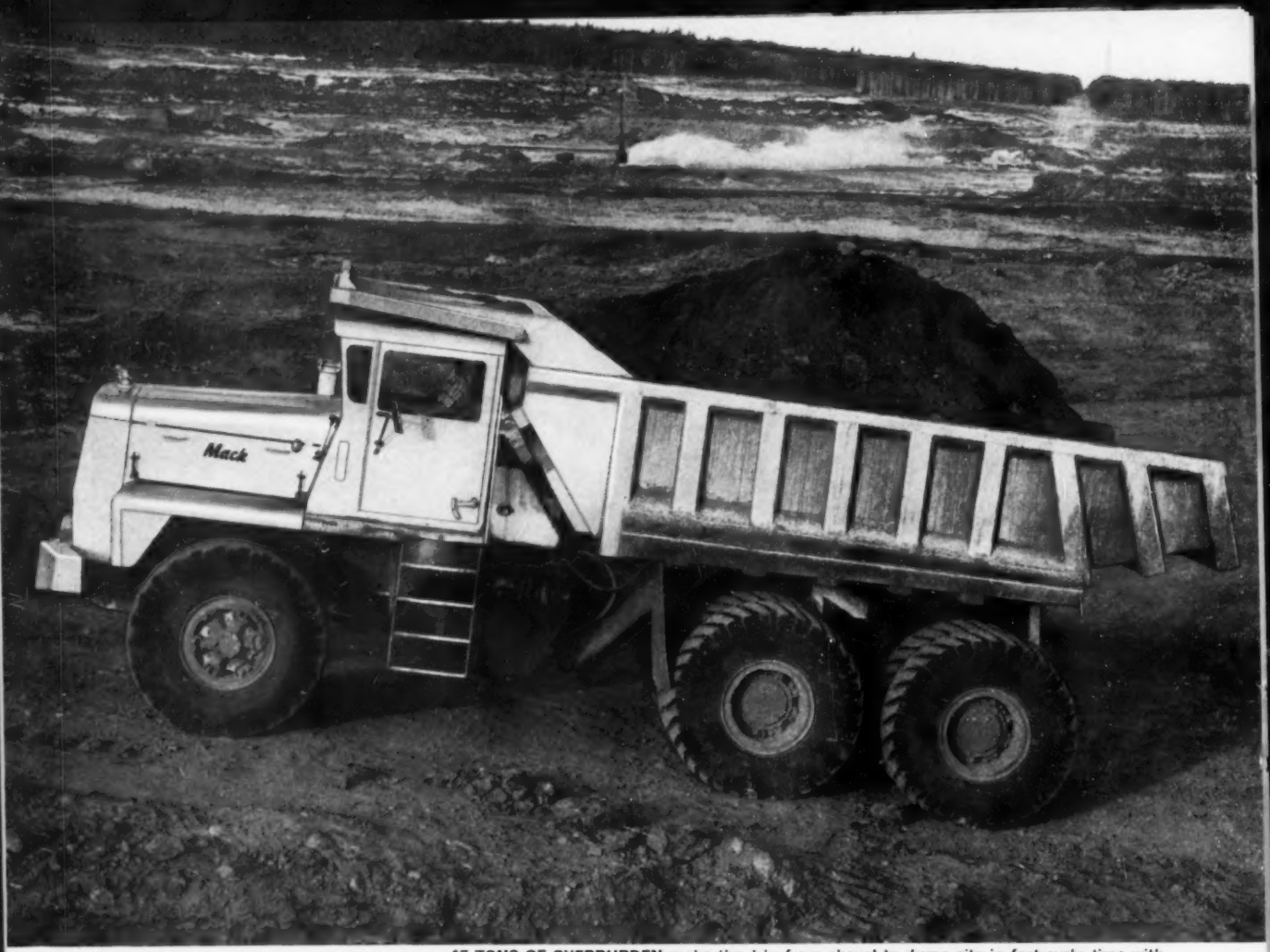
That's right "On The Ball", at Coates the entire plant is devoted exclusively to the manufacture of grinding balls . . . and that's not all, Coates, conducts a continuing research program to improve its already highly rated product. Coates Grinding Balls grind better, last longer and wear more evenly because, they are carefully made of special formula, fine-grained, high-carbon steel, checked and calibrated to be more perfectly round . . . scientifically heat treated to the very core, to be tough and rugged. Call for Coates Triple-Forged Grinding Balls . . . built with care for longer wear.

CS61-3

COATES STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA



45 TONS OF OVERBURDEN make the trip from shovel to dump site in fast cycle time with Mack M-45SX on the job. Put to the test of the toughest of all hauling jobs in the northern Minnesota iron mines, this six-wheel dumper chassis comes through with flying colors.

TAKE THEIR MEASURE BY WHAT THEY DO

In northern Minnesota, the iron capital of the U. S., you gauge a working vehicle by what it does—either it has what it takes or its hasn't.

With such a strict rule of thumb, it's no wonder Mack superiority made itself known early. In this rough and rugged hauling business, Macks carved out a permanent niche for themselves by their ability to continually deliver top-notch performance.

Now the new 45-ton six-wheel Mack M Model, made for mining with mining-duty components, is giving new meaning to durability and trouble-free performance.

Among the contributors to its all-around excellence are a Mack off-highway bogie that's the last word in rugged, load-carrying tandem axle capacity . . . a sturdy frame that stands up under jarring drop loads of big shovels . . . and a new cab that lets drivers concentrate on quick, safe cycles without concern about the vehicle.

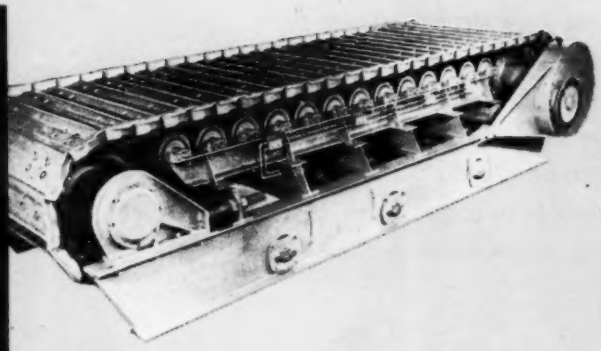
If you want to cut the ton-mile costs of heavy-duty hauling, investigate the new Mack M-45SX six-wheel dumper. It will open your eyes to new standards of economy and efficiency in heavy-duty hauling. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario. 8158

MACK
FIRST NAME FOR
TRUCKS

Build Profits with NICO

MATERIAL CONVEYING EQUIPMENT

The only basic design changes in feeders in the past generation.



NICO **Apron Feeders**

NICO **Apron Conveyors**

NICO **Bucket Conveyors**

NICO **Bucket Elevators**

NICO **Reciprocating Feeders**

NICO **Hydrastroke Feeders**

NICO **Hi-Torque Reducers**

Learn the benefits of Modern Design . . .

Engineering Catalog 60-A tells the complete NICO Conveying story. Photos, detailed drawings, diagrams, together with engineering data and specifications make it an invaluable reference in determining the right feeder or conveyor. Ask your NICO representative or write direct for your copy.

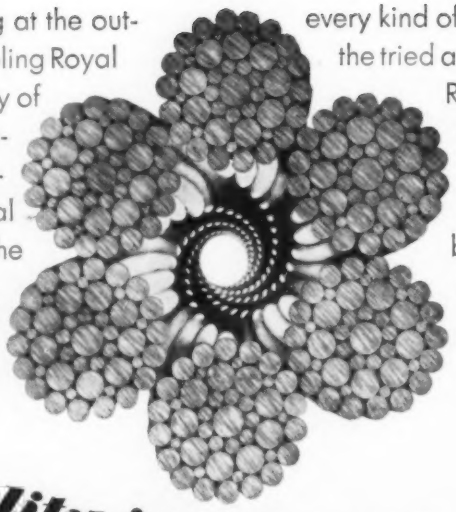
NICO

NATIONAL IRON COMPANY

50th Avenue West and Ramsey Street • Duluth 7, Minnesota

Subsidiary of Pettibone Mulliken Corporation, Chicago 51, Illinois

Here are two ways of looking at the outside and *inside* quality of Roebling Royal Blue Wire Rope—the uniformity of wires and strands. Their symmetry would be relatively insignificant, however, without Royal Blue's *extra* high strength. It's the combination that is the source of real wire rope savings. For long, economical service on every kind of job, there is no substitute for the tried and proven quality of Roebling Royal Blue. It pays off for *you*. Learn more about Royal Blue from your wire rope distributor, or write now for free booklet to Roebling's Wire Rope Division, Trenton 2, N.J.



ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation.

Quality inside and outside

We put a lot of work into it—
You get a lot of work out of it

NEW heavy-duty crawler drill

MOST RUGGED—tons of sound design
MOST POWERFUL—outperforms 5½" drills
MOST VERSATILE—4" to 6½" holes, vertical to horizontal

The new Ingersoll-Rand Crawlmaster is a *multi-purpose machine* that meets every requirement for percussion, rotary or Downhole drilling of 4" to 6½" blast holes in any type of ground. Here are just a few of its outstanding features:

Constant-Pressure, Double-Acting Hydraulic Feed—smooth, infinitely-variable power for drilling pressure or pulling stuck steels. Drill won't jump ahead in pockets or fissures.

Simple Hydraulic Control Of All Tower Positions. Tilting of tower on yoke and raising or lowering of yoke hydraulically powered by separate cylinders. All throttles outfront for easy operation.

Throttle-Controlled Reverse Rotation permits fast uncoupling of steels without having to climb tower to reverse drill.

Ejector-Type Dust Collector has no moving parts to wear out or maintain. A simple air-jet does all the work.

Heavier—Extra weight is reflected in sound design assuring extra stamina for the toughest drilling jobs. Has rugged, tractor-type crawlers with enclosed gear drive.

Four 30" Stroke Hydraulic Leveling Jacks permit accurate tower positioning with maximum stability on rough terrain.

Hoist, Rod-Changer And Hydraulic Wrench greatly simplify addition or removal of steel sections.

Interchangeable drills and rotation units permit one machine to be used for percussion, rotary or Downhole drilling of 4" to 6½" holes, taking power from a 600 or 900 cfm portable compressor. For a new high in drilling speed and economy, ask your I-R engineer for the Drillmaster story. Or send for Bulletin 4211.

Ingersoll-Rand
33A5 ♥ 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

P&H
P&H
1800

IF PURCHASES ARE ENDORSEMENTS...

P&H is the no. 1 choice in copper mining

Every electric shovel bought for the Southwest by copper companies in the past year has been P&H

Typical of P&H acceptance in copper mining, today you will find *three* or *more* P&H Electric Shovels working at each of 8 out of Arizona's 9 operating copper mines.

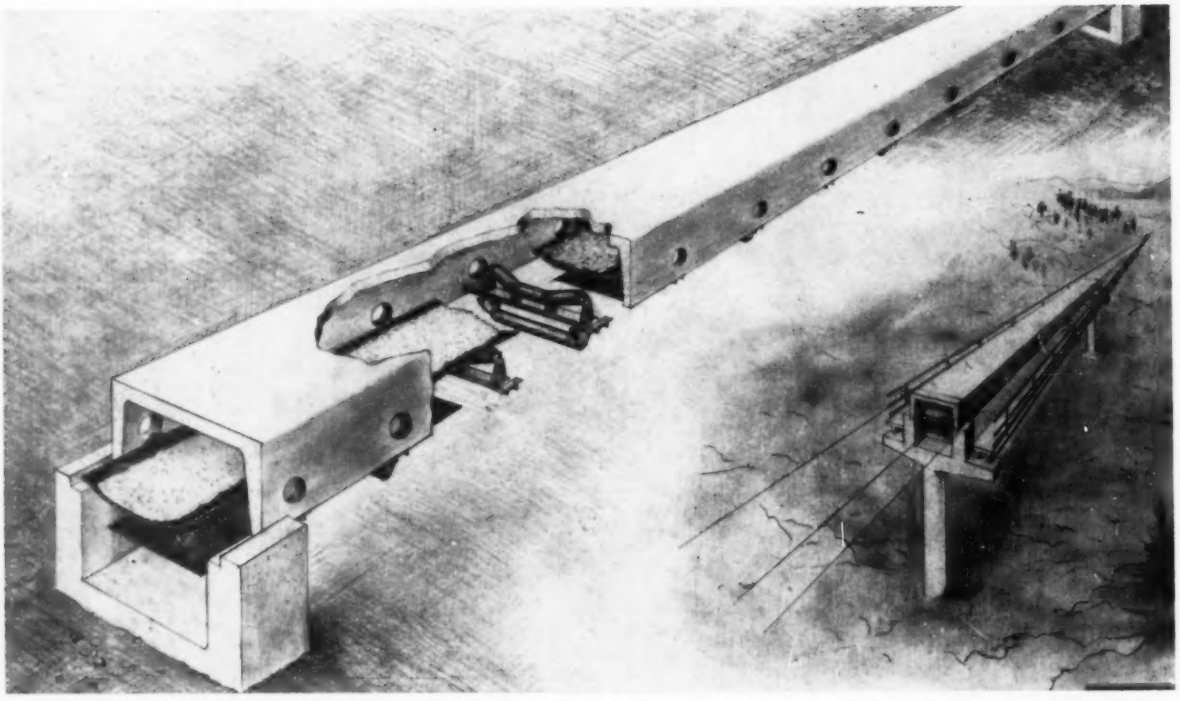
P&H has earned such widespread acceptance in the copper mining industry because of lower per-ton loading cost. This profit premium to owners of P&H Electrics results from two basic advantages.

1. Higher rate of production made possible by exclusive, patented P&H design principles: MAGNETORQUE® Hoist Drive and Electronic Control.

2. Vastly superior service and parts availability reflecting our partnership of responsibility to you, the buyers of our products.

Your satisfaction with these advantages has made us the *World's Largest Builder of Full-electric Shovels.*

HARNISCHFEGER P&H
Milwaukee 46, Wisconsin



Engineer's sketch of a 1½ mile CALCOVEYOR installation at a western plant.

Revolutionary Design

CALCOVEYOR

Saves you up to 40%

New belt conveyor system of prestressed, reinforced concrete costs 40% less to install. Lower operation and maintenance costs, too. Unique among conveyor systems, with U-shaped concrete channels doubling as protective cover for belt, drive, idlers, and materials load.

Will design, furnish or erect any or all parts, or work on a royalty basis with engineering or construction firm or user. Select own idlers and belt. Any manufacturers' equipment can be used.

WRITE TODAY for detailed cost analysis of actual installation on the West Coast. Lower installation cost only part of the story. Also lower operation and maintenance cost. Examine comparative figures for yourself.

Ideally Suited For:

Open Pits	Inter-Plant Conveying	Conveying & Reclaiming
Crushing Plants	Material Stockpiling	Many Other Applications

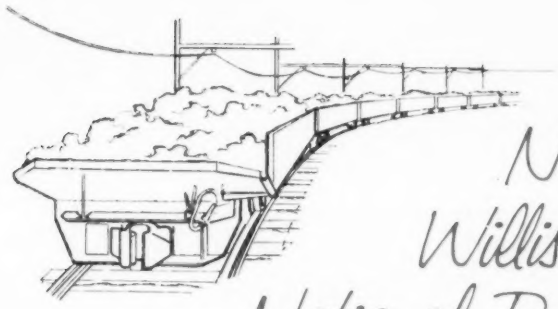
Abbreviated Cost Comparison Data

COMPLETE SUPPORT SYSTEMS FOR 36" WIDE BELT
NOTE: THESE ARE ESTIMATE BIDS WITH PIERS AND FOOTINGS IN PLACE.

REINFORCED CONCRETE	STRUCTURAL STEEL FRAME WITH CORRUGATED COVER	PRESTRESSED CONCRETE
(58'4" Span) Cost/Lineal Ft.	Cost/Lineal Ft.	(58'4" Span) Cost/Lineal Ft.
$18.20	$32.35	$25.36

CALCOVEYOR

FRANK J. MADISON COMPANY
315 Montgomery Street • San Francisco 4, California
Telephone: SUtter 1-1747 or YUkon 6-6635

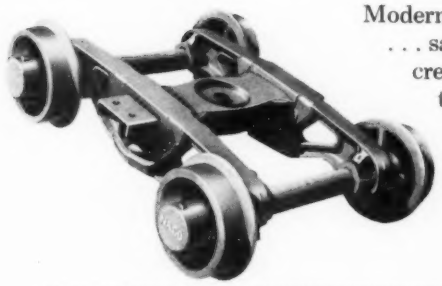


Get Constant Haulage with*

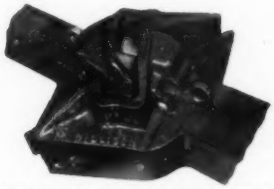
NC-1 Mine Car Trucks
Willison Automatic Couplers
National Rubber Cushioned Devices

*Constant Haulage means volume haulage . . . every minute your mine is operating . . . no costly, undue delays if equipment breaks down.

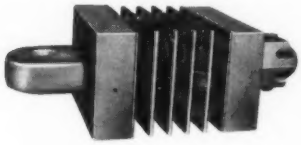
Modern mine cars . . . equipped with National car components . . . save you minutes, hours, pennies, dollars . . . and increase mine production! Check your National representative for details.



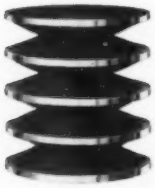
NC-1 Mine Car Trucks. Special load carrying springs with friction snubbing mechanism control vertical and transverse oscillations.

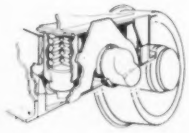


Willison Automatic Couplers. Automatically couple at either end, over wide gathering range, permit higher speeds with greater safety.



Rubber Cushioned Device (Longitudinal). Unit shown absorbs end-to-end impacts, gives soft cushioning action that stretches equipment life.





Rubber Cushioned Device (Vertical). Greater load carrying capacity while minimizing vertical oscillation of cars through high absorption characteristics.

Mine Sales • Transportation Products Division

A-419HA

Other mine products from
Capitol Foundry Division, Phoenix, Arizona

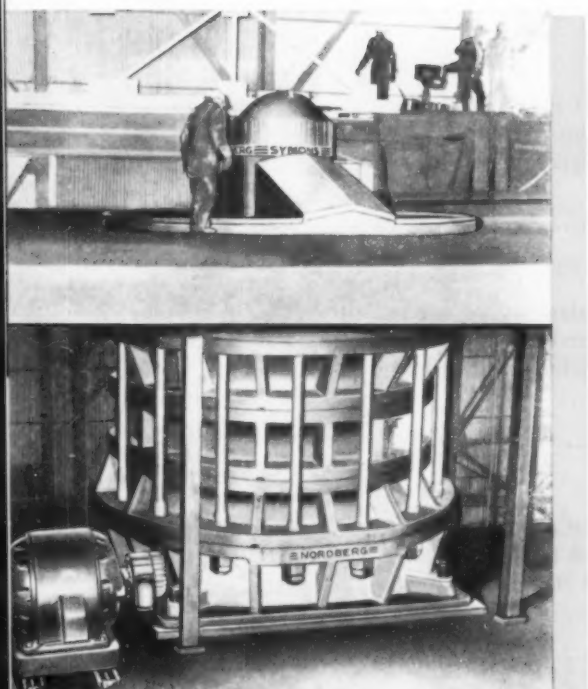
NACO CAST STEEL HEAT TREATED GRINDING BALLS
SHOVEL TEETH • MILL LINERS • DISCHARGE GRATES
CRUSHER JAWS • MANGANESE STEEL CASTINGS
CARBON AND ALLOY STEEL CASTINGS

NATIONAL
MALLEABLE AND STEEL
CASTINGS
COMPANY
Cleveland 6, Ohio

Users repeatedly specify

NORDBERG MACHINERY

for reliable, low cost production of ORES and MINERALS



FOR PRIMARY CRUSHING OF MOLYBDENUM

This 60″ Symons Primary Gyratory Crusher has seen several years of service in the primary breaking of "moly" ores in Colorado. Other heavy duty Symons Gyratory Crushers are built with 30″, 42″, 48″, 54″ and 72″ feed opening widths and for capacities to 3500 or more tons per hour.

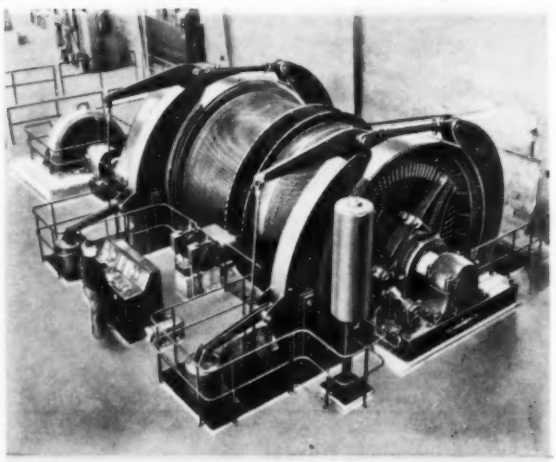
Your interest in lowering the cost, improving the quality, and raising the production of metallic and non-metallic ores and industrial minerals is a mutual interest which Nordberg has shared with the mining industry for 75 years.

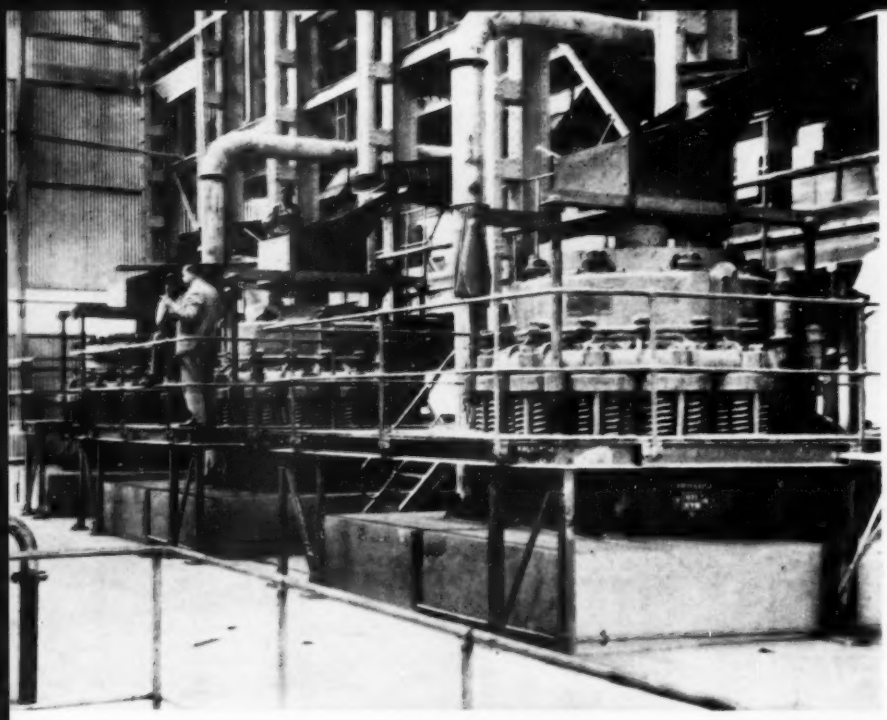
This common interest and the many years of broad, yet intimate experience with the mining fraternity is reflected in the effectiveness and quality of Nordberg mining machinery. It is because of this background that Nordberg continues to lead in the design and construction of mining machinery which is *consistently first choice of the world's leading ore and mineral producers.*

SYMONS . . . a registered Nordberg trademark known throughout the world.

FOR HOISTING IRON ORE

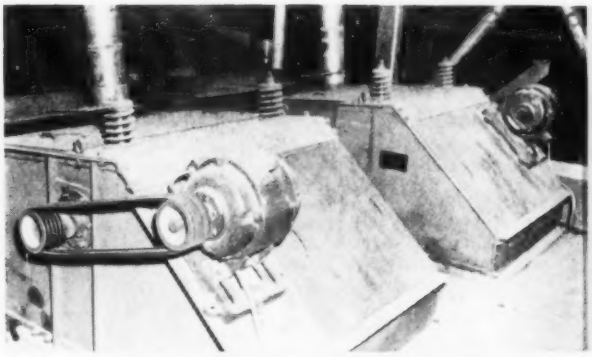
Nordberg Mine Hoists for men and material are built in both conventional drum types as well as friction types . . . for push-button semi-automatic, fully automatic or manual control. Shown is a typical conventional double drum hoist.





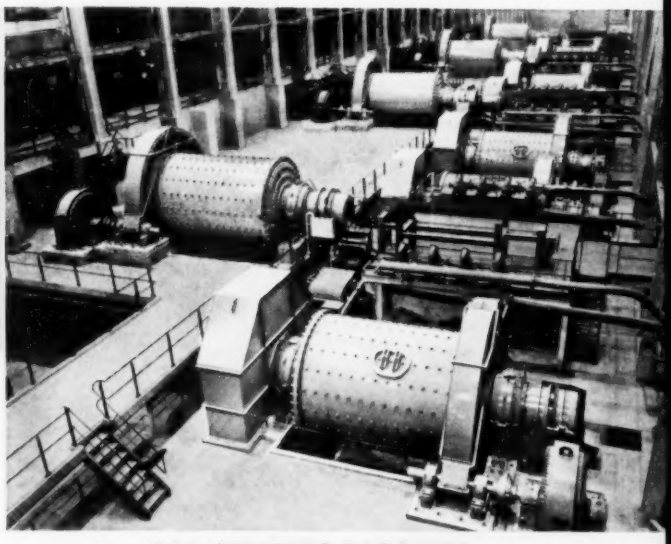
FOR FINE REDUCTION CRUSHING OF COPPER

These three Symons Cone Crushers are serving a Northern Rhodesian copper mine installation. Used for low cost, continuous production of quality products, Symons Cones are first choice of major producers the world over, in capacities to over 1500 tons per hour.



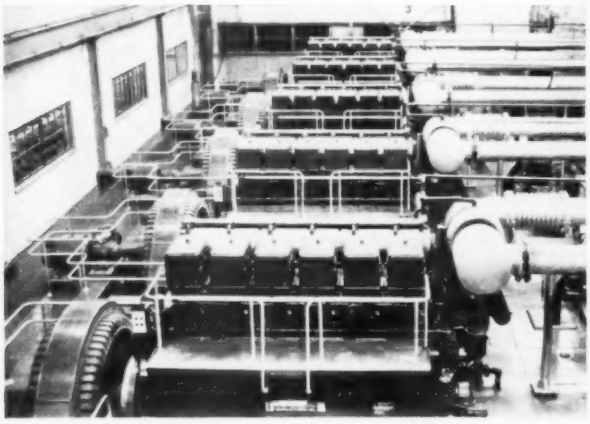
FOR SCREENING URANIUM ORE

These two 4′ x 8′ Symons Rod Deck Screens serve a large uranium processing operation in Canada. Other Symons Vibrating Screens are built in a wide range of types and sizes to handle numerous ore and mineral separation jobs from scalping to fine screening.



FOR GRINDING TACONITE

Shown are but a few of the many Nordberg Grinding Mills being used to reduce hard, abrasive taconite iron ore to the fineness of flour. Nordberg mills include Rod, Ball, Pebble, Tube and Compartment types, in sizes to 13′ in diameter and up to 50′ in length.



FOR POWER GENERATION

Nordberg 2-cycle and 4-cycle diesel, Duafuel®, and spark-ignition gas engines are reliably serving the mining industry in many parts of the world. Sizes range from 10 to over 12,000 hp in a single engine.

NORDBERG MANUFACTURING COMPANY • Milwaukee 1, Wis.

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHOENIX
ST. LOUIS • SAN FRANCISCO • TAMPA • WASHINGTON • WICHITA, KANS. • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

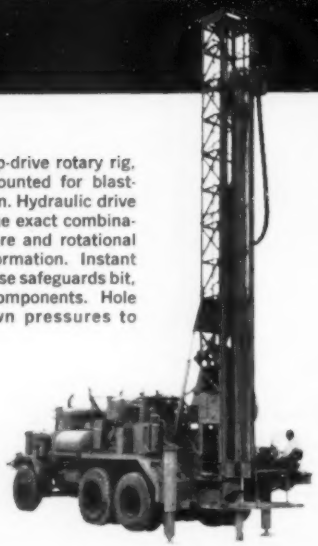
©1961, N.M.CO.

M181

CP DRILLING EQUIPMENT... built for top footage records

REICHdrill

An all-hydraulic, top-drive rotary rig, truck or crawler-mounted for blast-holing or exploration. Hydraulic drive and feed permits the exact combination of feed pressure and rotational speed for every formation. Instant Safety Torque Release safeguards bit, stem and drive components. Hole sizes to 16"; down pressures to 90,000 lbs.

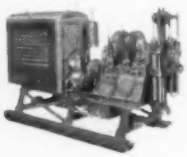


G-900 TRACDRIL

insures more blast-holes from a single set-up because of 180° "Boarding House Reach." Drills directly alongside tracks on either side. Runs horizontals 11 feet high; snake holes at ground level. Heavy-duty safety brakes lock automatically when tramming throttle is released. Two sets of grouped controls — one at turret, the other at boom end — save time and steps for driller.

CP-65 AIR-DRIVEN DIAMOND DRILL

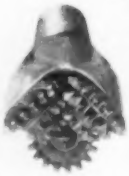
the most outstanding underground blast hole and coring drill in its class. High torque 20 hp motor gives high drilling speed; greater capacity. Reversibility speeds up unscrewing of rod joints. Drill, with built-in swivel head measures only 42¼" long . . . weighs just 200 lbs. Coring capacity to 600-ft. with EW rods and EX fittings.



CP-15HD DIAMOND DRILL

for surface exploration. Skid-mounted, it moves from hole to hole under its own power. Knocks down for transportation. Can be furnished for truck or jeep mounting. Capacity with EW-EX fittings — 2,250 feet. Air or electric drive.

CP 3-CONE AIR-BLAST BITS



give maximum footage for rotary deep-hole drilling. Jet and standard models provide high-velocity hole cleaning action. A bit type for soft, medium and hard formations. Sizes from 5⅝" to 12¼".

CP "POWER VANE" ROTARY COMPRESSORS

are available in capacities from 85 to 900 cfm. Their "go-power" keeps air-operated equipment producing at full capacity. They stay on the job 'till you say "stop." Smooth running and economical. Available with gasoline or diesel engine drive.

IN ADDITION MINE OPERATORS DEPEND ON THESE CP PRODUCTS FOR TOP FOOTAGE RECORDS

Hydraulic Boom Arms . . . Shaft Jumbos . . . Stopers . . . Drifters . . . Airlegs . . . Sinkers

Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

PNEUMATIC and ELECTRIC TOOLS • AIR COMPRESSORS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AIR-BLAST BITS

ASEA'S NEW MINE HOISTS BREAK WORLD'S LOAD RECORD

ASEA's new multi-rope friction mine hoists for installation in one of the largest mines take an unbalanced load of 55 tons at a speed of 2760 feet per minute—twice the load of any known hoist at this record speed.

Here are two major advantages of these new mine hoists pioneered by ASEA for mine owners everywhere.

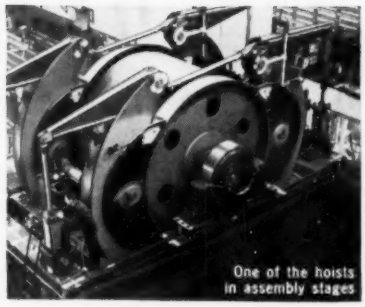
1 MULTI-ROPE FRICTION DRIVE; this enables a moderate sized pulley (length, 7'2", diameter, 12'2") to take a very high unbalanced load with ease.

2 FULLY AUTOMATIC OPERATION, which can save as much as $30,000 a year per hoist at prevailing U.S. wage rates, assuming two-shift operation.

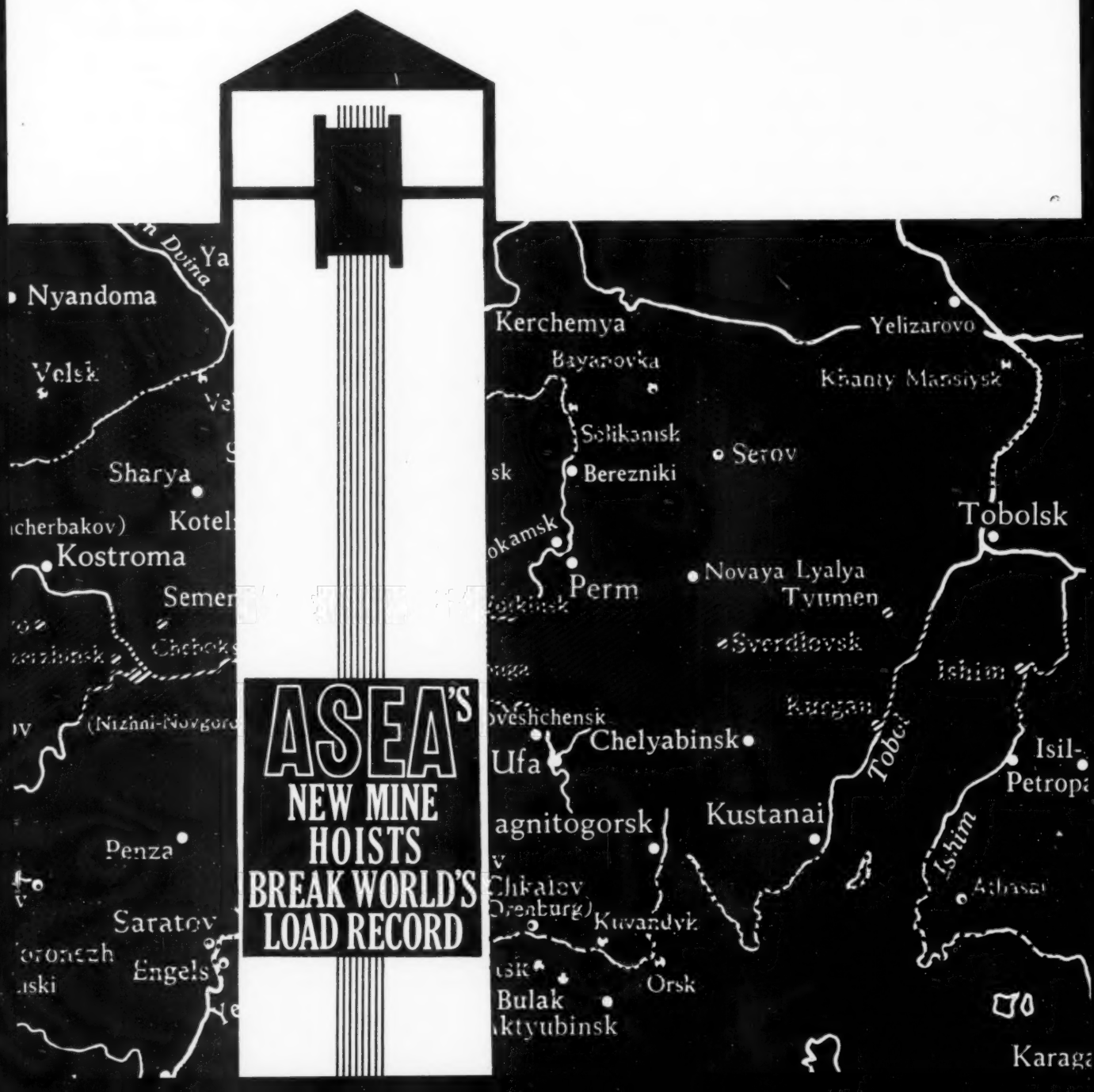
Make profitable use of ASEA design and engineering experience. Let ASEA save operating costs—in a big way just as it saves for 14 U.S. and Canadian mining companies. Write for literature to: ASEA ELECTRIC INC. 500 Fifth Avenue, New York 36, New York and 55 New Montgomery Street, San Francisco 5, California.

TECHNICAL DATA

Hoisting	Double Skip	Hoisting speed	2760 ft. per min.
Hoisting capacity	1400 tons per hour	Number of ropes	8
Net load	55 tons	Rope Diameter	1¾"
Skip weight	44 tons	Diameter of Pulley	12'2"
Depth of shaft	3940 ft.	Length of Pulley	7'2"
		Motor output	12,000 h.p.



One of the hoists in assembly stages



GEOLOGISTS look to research for

using new exploration tools and concepts; field studies will

Exploration in 1960 generally was at about the same moderate pace that marked the activities in 1959. Contractors of exploration services say their demand was related to programs directed toward copper, iron, and lead, in that order. The use of airborne magnetic and electromagnetic methods decreased from prior years in Canada, but continued at a gratifying level in other countries. Geochemical prospecting suffered curtailment in North America, although the massive soil and stream sediment sampling programs in the Rhodesias seem not to have been lessened.

Notable deviations from the generality of a moderate pace give assurance that we need not fret about a lack of new discoveries and the subsequent development of new sources of raw materials. Southeast Missouri continued to be the area of most active exploration in North America. Twelve major mining companies provided intensive and extensive exploration never before seen in that locality. The perennial high level of activity in the southwestern United States in the search for porphyry copper deposits was accentuated by a rush for position in the Twin Buttes area south of Tucson, Arizona. The westward movement of iron exploration concentrated in the Basin and Range province, especially in western Nevada and eastern California. Discoveries of beryllium at Topaz Mountain, Utah, touched off a local land rush reminiscent of the uranium boom. Another beryllium discovery at Mt. Wheeler, Nevada, created a flurry of excitement.

The year 1960, however, was devoted principally to the evaluation of properties already held and to the preliminary work that sets the stage for future exploration activities.

The events of the present that will influence exploration in the future originate from many sources. The evolution of modern exploration techniques has wrought changes in the makeup of the organization; the trend for amply financed groups to apply these techniques in surveys of large areas has recast the problems and considerations of exploration management. The planning function takes into account the impact of governmental actions and will note that Southern Rhodesia will remit royalties on 1960 production from specified mines, that British Columbia has revised the reserve and royalty regulations dealing with iron ore, that Mexico has announced a possible law that will make it easier for Mexicans than for others to mine in Mexico, and that Venezuela has released a mineral policy that increases restrictions on private mining.

Horizons now being probed in the research sphere will yield new tools and new concepts for exploration; the field studies going forward on many frontiers will show new localities in which to apply them.

Revitalize many old

The copper province of the southwestern United States received its perennial close scrutiny and active search for porphyry copper deposits. A high level of activity throughout the province was accentuated by a rush for position in the Twin Buttes area south of Tucson, Arizona. The report by J. R. Cooper on "Some Geological Features of the Pima Mining District," United States Geological Survey **Bulletin 1112-C**, sparked the renewed interest. Western Nevada was the site of a substantial portion of the exploration effort for copper in the western United States.

Phelps Dodge Corporation purchased claims near Safford, Arizona, and became the second company to take a position in that area; Kennecott Copper Corporation purchased 120 claims in the area in 1959. Duval Sulphur and Potash Company is engaged in extensive exploration for copper east of Kingman, Arizona. Bear Creek Mining Company filed on some six square miles in the southern Dragoon Mountains, Cochise County, Arizona.

Elsewhere in the United States evaluation of properties under in-

Newest rush to west

Another rush is being added to the history of the West—both American and Canadian; iron ore takes a place beside furs, gold, and land. This rush is restrained, to be sure; it's an industrial and not a romantic story, but its impact on the history of the West may be greater than that of its predecessors. The population shift, the Japanese appetite for iron ore, and the direct reduction process for treating ores without coke are the magnetic attractions pulling the iron ore explorer. Impetus is added to exploration by reports that Japanese

tomorrow's discoveries

show how to use them in new localities

Jack A. James
Consulting Geologist
211 Bellair Road
Ridgewood, New Jersey

mining districts by evaluating field results with new concepts

vestigation in past years continued during 1960. Bear Creek Mining Company again drilled for copper in the Ruby-Kobuk area of northwestern Alaska; acquired property and drilled in the vicinity of Lane City, White Pine County, Nevada; drilled in Mason Valley north of Yerington, Nevada, where it filed on 110 claims and persuaded the City Council of Yerington to relinquish applications for land they planned to use as a community dump ground; conducted extensive investigation in areas adjacent to the mines at Ruth, Nevada, and continued exploration activities begun in 1953 at the Glacier Peak copper property in eastern Snohomish County, Washington. Newmont Mining Corporation drilled a copper-nickel prospect in the Brady Glacier area north of Dundas Bay, southeastern Alaska. The Anaconda Company acquired 12 sections of land northwest of Milford, Beaver County, Utah, from operators in the San Francisco and Rocky mining districts. Copper Range Company is sinking a shaft to develop deep ore southwest of the White Pine mine, Ontonogan County, Michigan. United States Metals Refining Company, a subsidiary of American Metal Climax, Inc., drilled in the same area.

Exploration for copper certainly was not at a standstill in Canada. Craigmont Mines Ltd. boosted ore reserves to 17,600,000 tons containing 2.08 percent copper and 20.2 percent iron. Production plans are finalized and the excavation has been made for a concentrator rated at a capacity of 4,000 tons of ore per day. Kam-Kotia Porcupine Mines Ltd. reported good progress in installing an 800 ton per day mill at its property 24 miles west of Timmins, Ontario. The completion date is set for February, 1961. McIntyre Porcupine Mines Ltd. added substantial tonnage to the copper zone in its gold mine near Porcupine, Ontario.

Other exploration in Canada, too, was pointed toward exaluation of properties investigated previously. Reports say Howe Sound Company found a good mineral structure at the Britannia mine, British Columbia, and that chances are excellent for other ore bodies. It may take a year to test the structure. Granduc Mines Ltd. has been advanced funds to continue geologic studies not finished in 1959 at the Granduc property, British Columbia. Jericho Mines Ltd. announced plans to drill property in the Highland Valley, British Columbia, where road construction revealed mineral showings. Portage Island Mines Ltd. has begun a drilling program to measure the grade and potential for ore on three levels opened recently at its property near Chibougamau, Quebec. Kennco Explorations (Canada) Ltd. is drilling to evaluate the sulphide body at Murray Brook and a copper-rich skarn zone at Popelogan Lake, New Brunswick. Noranda Mines Ltd. drilled a copper-nickel prospect near the headwaters of the northwest Miramichi River, New Brunswick.

Reports say the copper discovery near the old Yabricoya mine in the localities known as Mocha and Cerro Colorado in Tarapacá province, Chile, made by personnel of the Instituto de Investigaciones Geologicas in collaboration with geologists of Point Four, may be an important copper deposit. Cerro Corporation is developing a good grade copper ore body at the Cobriza mine, 115 miles southeast of La Orova, Peru.

seeks iron ore deposits in United States and Canada

firms could, in a few years, double or triple the present $30,000,000 per year rate of purchases of iron ore from British Columbia and are eyeing the possibility of establishing iron and steel plants in British Columbia. The leading news items in Nevada in 1960 were reporting exploration for iron ore; it is expected that iron will continue in this status, and a three-part report of a cooperative study by the Nevada Bureau of Mines and the United States Geological Survey of the iron ore resources in Nevada is available to guide those groups ready to meet this challenge of the 1960's.

Jackson Mountain Mining Company added to ore reserves by discoveries made in the course of underground preparations for block caving at its mine north of Jungo, Nevada. Utah Construction and Mining Company drilled more than 200 diamond drill holes in its exploration program north of Dayton, Nevada, where substantial reserves of low grade iron ore were found. The Columbia-Geneva Division of U. S. Steel Corporation was active in the Mineral Basin area in Pershing County, Nevada, where Southern Pacific Land Company last year revealed 132,000,000 tons of iron ore, and also near Yerington, Nevada, in testing an anomaly discovered by an airborne magnetometer survey.

Geological and metallurgical investigations of Clinton sandstone iron deposits in Virginia by Virginia Polytechnic Institute have brought these deposits to the brink of economic promise and utilization on a large scale. Technological breakthroughs in processing the low grade

ores to yield hematite concentrate are the key results.

Nevada did not capture all the news, and the activities elsewhere emphasize the broad front of the wave of iron ore exploration. Columbia-Geneva Division initiated development of the $73,000,000 taconite-iron mining project north of Atlantic City, Fremont County, Wyoming; Lyman Construction Company commenced production from the magnetite body on the Bruce property near Gilmore, Idaho.

American Zinc, Lead and Smelting Company announced a large iron ore body in the Precambrian basement rock at Bourbon, Missouri. The Zinc Company reports satisfactory drilling results from an iron-copper body, also in the Precambrian basement rock, near Boss, Missouri. Zontelli Brothers continued to drill a magnetite ore body near Potlatch, Idaho.

The Anaconda Company furthered development of the iron deposit at Skibi Lake, Ontario, by drilling, pilot mill operations, and extensive road construction. The Interprovincial Steel Corporation Ltd. has proved 36,000,000 tons containing 30 percent iron on properties near Choiceland, 60 miles east of Prince Albert, Saskatchewan. Probable reserves are estimated in excess of 100,000,000 tons. Rio Tinto Mining Company of Canada Ltd. drilled optioned properties in the Temagami area, Ontario, to confirm previous ore indications. Jones and Laughlin Steel Corporation accelerated the drilling program at Bost Township, seven miles southeast of Kirkland Lake, Ontario. Consolidated Mining and Smelting Company of Canada Ltd., Empire Development Company Ltd., and Coast Copper Company Ltd. agreed on terms for exploration for iron and copper on the west coast of Vancouver Island.

Southeast Missouri gets most extensive exploration in all of North America

The big news in lead-zinc in 1960 was the start-up of St. Joseph Lead Company's new mine at Viburnum, Missouri. This mine is the first to produce from this newest of lead-zinc districts, and it is a milestone in the history yet to be made in the area. Twelve major mining companies are exploring the area, but rumors that "several other lead ore bodies have apparently been discovered" have not been confirmed.

A new zinc mine seven miles southeast of Platteville, Wisconsin, is a reward to New Jersey Zinc Company for eight years of persistent effort in that area. Goldfields Consolidated Mines Company reopened the Anderson zinc mine in northeastern Washington to reach ore bodies located by geochemical prospecting and drilling; an operation at the rate of 1,500 tons of ore per day is planned. Hudson Bay Mining and Smelting Company Ltd. put the Chisel Lake zinc mine in Manitoba in production when the railroad to the property was completed in September; it is continuing development work at the Stall Lake mine in the same area.

The Tri State Zinc Company completed a drilling program on the New Market property in Jefferson County, Tennessee, which was optioned from the American Zinc Company of Tennessee. New Jersey Zinc Company completed "fill-in" drilling for two more zinc mines in the Copper Ridge district, Tennessee. Tennessee Copper Company continued to gain satisfactory results for lead-zinc ore at the Silver Hill mine, Davidson County, North Carolina. The Anaconda Company has taken options on the Scranton mine eight miles north of Eureka, Utah; the Northern Mining and Milling Company Inc. obtained one of the largest OME contracts given in the northwest in recent years for underground exploration at the Marietta mine in Broadwater County, Montana; The Triton Mining Company reported a high-grade zinc vein encountered in the Schumaker mine, northeast of Coleville, Washington.

Lead-zinc deposits in New Brunswick, discovered in prior years, received further exploratory and development attention in 1960. Heath Steele Mines Ltd. reopened its Little River property for underground exploratory and development work; Brunswick Mining and Smelting Corporation Ltd. drilled several holes on its No. 6 project to test for possible extensions of ore; New Jersey Zinc Exploration Company (Canada) Ltd. drilled at Portage Lakes; The Anaconda Company (Canada) Ltd. bulk-sampled a sulphide zone intersected by an adit being driven at the Caribou property; Consolidated Mining and Smelting Company of Canada Ltd. has completed a 3-compartment shaft and 3,200 feet of underground work at the Wedge property.

Gold-Silver-Beryllium

The outflow of gold from the United States did not trigger a massive exploration effort for this noble metal in the United States; neither was it ignored. No significant revival of interest in lode gold deposits was displayed in Alaska. A slight increase of interest was apparent in the activities in the Precambrian area of Saskatchewan, and the former gold-producing areas in Nova Scotia were given some attention.

Additional supplies of gold are in the offing from a modern recovery plant at the Star Mine near Star, North Carolina; from the new gold-silver discovery in the Crested Butte district, Colorado; and the H. G. Young mine in the Red Lake area of Ontario, which reached production in 1960. New ore zones at operating mines are known or under investigation in the Malartic, Val d'Or, and Chibougamau districts, Quebec, and at Rice Lake in southeastern Manitoba.

Alaska State Mines drove 350 feet of tunnels through the ice of Texas Creek Glacier near Hyder, Alaska, to find a deposit of electrum. Noranda Mines Ltd. made a discovery of gold about 60 miles southeast of Kenora, Ontario; this find touched off a staking rush, and several companies are reported to be exploring the area. Chesterville Mines Ltd. reported a discovery 15 miles east of Longlac, Ontario.

Silver gained attention from news that the United States government's stock is being diminished materially in order to fulfill the demand for coinage and industrial uses, but this news did not generate an unusual amount of exploration for the metal.

Ore discovered in five veins in the New Departure mine at Bannack, Montana, is reported to raise the grade of ore reserves to 30 ounces of silver per ton. A new strike at the east end of the silver belt in the Coeur d'Alene district, Idaho, was reported by Nancy Lee Mines Inc. Cardiff Industries Inc. believes the original Cardiff silver ore body in the Alta-Brighton district, Utah, has been encountered and that the ore may extend upward 280 feet to the 1,400 level. United Park City Mines Company cut a high-grade vein two feet wide on the 900 level of the Keystone mine, Park City district, Utah. The Gold Eagle Mining Company found ore at the Sally Louise mine 40 miles southwest of Tonopah, Nevada. Kennecott Copper Corporation gained encouragement from underground exploration and development at the

Chief Oxide-Burgin project in the East Tintic district, Utah. Ruby Hill Mining Company is drilling to determine the extent of ore revealed by the Eureka Corporation in the Eureka district, Nevada.

Enthusiastic forecasts of the potential demand for beryllium captured the imagination of many persons, in and out of the mining industry, who foresaw either a government-supported boom in beryllium or an attractive growth rate, albeit somewhat below boom proportions, in industrial applications. These views prompted both systematic and unsystematic hunts for concentrations of beryllium minerals, especially those that might indicate large deposits. The berylometer urged fast-moving exploration programs designed to "get there first-est with mostest." Many discoveries were reported in 1960, but few have been verified for their economic feasibility.

Beryllium Resources Inc. announced plans to construct a mill at its deposit at Topaz Mountain, Utah. The Anaconda Company optioned claims in the Mt. Wheeler, Nevada area. There is a reported discovery on the east side of Mt. Baldy, west of Calico, Utah. The Idaho Bureau of Mines and Geology has a report on open file that deals with the showings of beryllium minerals in the Sawtooth Mountains, where aquamarine beryl is disseminated in granite. Beryllium minerals have been exposed in trenches on Calispell Mountain, 20 miles northeast of Chewelah, Washington. U. S. Beryllium Corporation made discoveries at its Redskin mine, Park County, Colorado.

Columbia Metals Exploration Company Ltd. exposed beryl for more than 2,000 feet in trenches on claims near Yellowknife, North West Territory. Sirmac Mines reported lithium and beryllium minerals in large pegmatites 80 miles northwest of Chibougamau, Quebec. The beryl-bearing areas in Nova Scotia are rapidly being outlined. Rio Tinto Mining Company of Canada Ltd. optioned property in the Seal Bay area, Labrador, from Ventures Ltd. Prior work showed 0.24 percent Cb_2O_5 and beryllium; Rio Tinto is working to identify the beryllium compound mineralogically and metallurgically.

Trend to integrated surveys of large areas brings changes to exploration groups and their management

The trend becomes more and more pronounced for amply-financed groups to apply modern exploration methods and techniques in surveys of large areas. These methods and techniques involve integration of a variety of professional skills and are applied effectively as a team effort.

A three-year survey in northern British Columbia by Lundberg Explorations Ltd. for Werner-Gren interests resulted in more than 600 claims being staked on showings of asbestos, copper, mercury, iron, zinc, and nickel. An airborne geophysical survey by Anglo Turkish Development Company Ltd. yielded 19 major anomalies and prompted the company to option some 400 claims in Greenwood, British Columbia.

Asarco Exploration Company of Canada Ltd. conducted an integrated program including photogeology, airborne geophysics, geologic mapping, ground geophysics, and geochemical prospecting in northwestern Quebec. The news that this company was acquiring ground in Boyvinet, Gand, Kreighoff, and Montlambert Townships caused a staking rush to mushroom 100 miles northwest of Senneterre, Quebec.

The Colorado Fuel and Iron Corporation successfully completed two years of negotiations for exploration rights to all minerals except oil and gas on 188 square miles in the northwest sector of the Apache Indian Reservation in Arizona.

The program of Lyell-E.Z. Explorations to explore 4,500 square miles in southwest Tasmania is reported by B. Scott and H. W. Spooner in **The Australasian Institute of Mining and Metallurgy Proceedings, No. 195,** September, 1960. They present a clear picture of the composition of an exploration team for surveys of a large area and the problems inherent in such surveys.

The evolution of methods and techniques for exploration has wrought changes not only in the makeup of the field teams but also in the makeup of the total exploration organization and management.

Many exploration successes of 1960 must await later reporting

Molybdenum commanded considerable attention in 1960, and the most significant news was the announcement by Molybdenum Corporation of America that 260,000,000 tons containing five pounds of MoS_2 per ton have been indicated in the Red River district near Taos, New Mexico. Molybdenum mineralization investigated previously was drilled again in 1960 by American Metal Climax, Inc. near Neihart, Montana, and by The Anaconda Company at the Hall property north of Tonopah, Nevada. Bear Creek Mining Company acquired claims at the head of Death Valley and was evaluating them for commercial quantities of molybdenum.

Exploration was directed toward finding extensions of the Thompson-Moak Lake nickel belt in Manitoba. Roland F. Beers, Inc. drilled the bed of Crawford Pond near Union, Maine, to test nickeliferous pyrrhotite. It is reported Rio Tinto Mining Company made a discovery of nickel in Southern Rhodesia. Copper-nickel prospects were drilled in southeastern Alaska and in New Brunswick.

E. I. Dupont de Nemours and Company drilled, tunneled, and bulk-sampled its columbium property near Powderhorn, Colorado. St. Lawrence River Mines Ltd., continued development work at its property in the Oka district, Quebec. Molybdenum Corporation of America and Wah Chang Corporation announced plans to start construction of a mill at the columbium deposit near Araxá, Brazil; the completion date is set for mid-1961.

Thorium was the subject of attention by the Rare Metals Corporation of America in the Lemhi Pass area, Idaho. The company acquired more than 7,000 acres in the area and spent 1960 assessing and evaluating the holdings. Northwest Prospecting and Development Company is said to have indicated an extensive ore zone by a 13-hole drilling program at Hall Mountain, north of Bonner's Ferry, Idaho. The Hall Mountain Thorite Mining Company plans to explore adjacent ground for extensions of the ore zone.

An asbestos deposit near Stockton, California, was acquired by Jefferson Lake Sulphur Company which plans to bring the property into production at the rate of 2,000 tons of ore per day. A joint venture between Kern County Land Company and Johns-Manville Corporation will develop an asbestos deposit near Coalinga, California, for production in 1961.

The fluorspar district in Illinois

and Kentucky remained a depressed area exploration-wise. The Illinois Geological Survey is remapping the geology of Hardin County on the scale 1:24,000. In contrast, fluorspar mining in northern Mexico may gather into a small boom if present plans work out; the number of companies active in that area continues to increase.

Full-scale prospecting programs for phosphate were launched on Elk River near Veto, Alabama, by several companies now established in the Florida phosphate field. Experimental drilling yielded good first results in attempts to find a satisfactory method for mining the phosphate deposits near Bayview, Beaufort County, North Carolina. Monsanto Chemical Company was the successful bidder for 1,361 acres of phosphate land 18 miles northeast of Soda Springs, Idaho. Consolidated Goldfields of South Africa Ltd. reported the discovery of extensive deposits of phosphate in East Africa; prospecting continues to evaluate them.

A new $30,000,000 development will result from the work by Texas Gulf Sulphur Company on Delhi-Taylor Oil Corporation's potash-bearing land in southeastern Utah. Drilling for a shaft location is underway. Superior Oil Company has drilled six holes on the Lisbon Valley, Utah, potash prospect and additional drilling is scheduled for 1961. Two companies are approaching production of potash in Saskatachewan. Several other companies did exploratory drilling and made other investigations in 1960. The Morocco Mining Research Office reported deposits of potash in the vicinity of Khemisset, 40 miles east of Rabat, where reserves appear to be important.

New silica products plants were announced or brought into production in Kentucky by the Silica Corporation of America, in Washington by the Lane Mountain Silica Company, and in Idaho by the J. R. Simplot Company.

U. S. Sulphur Corporation installed facilities at High Island Dome east of Galveston, Texas, where the discovery is said to be the richest sulphur mine ever brought to production in this area. The Freeport Sulphur Company opened the Lake Pelto deposit, about 60 miles southwest of New Orleans, Louisiana.

Construction of a new $20,000,000 trona plant near Green River, Wyoming, was started by Stauffer Chemical Company. Kern County Land Company and Diamond Alkali Company are said to have added to reserves of trona in this area. The Reclamation Bureau announced that progress on the Seedskadee Project (Fontenella Dam) has been delayed because trona has been found underlying the area and will be evaluated before work proceeds.

Political climate is key to exploration

A flourishing natural resources industry is an important source of basic wealth, and the initial and inevitable steps in creating such an industry are the search and discovery functions of exploration. Some countries encourage the development of their mineral wealth by appropriate attitude and action, other countries allow potential mineral wealth to lie dormant and unchallenged because they fail to create and maintain the necessary business climate.

British Columbia revised the reserve and royalty system for iron ore by an order-in-council. The changes are expected to enhance the competitive position of British Columbia iron ore by decreasing development cost and lowering the average royalty payment.

Southern Rhodesia enjoys a sustained interest in exploration for and development of its mineral resources; 14 applications in 1960 for exploration concessions to 1,500 square miles attest to that interest. The Government has announced it will remit royalties on 1960 production from specified mines. Venezuela increased the restrictions on private mining in the minerals policy released by the Minister of Mines and Hydrocarbons. The policy declaration warns that holders of concessions risk losing their rights unless they comply strictly with the legal dispositions, and states that no more concessions will be granted for iron ore, bauxite, and geothermal potential for power. It implies a similar attitude toward other metals such as nickel and manganese. This policy release followed closely the cancellation of concessions held by M. A. Hanna Company, Republic Steel Corporation, and International Nickel Company. Three news items from Mexico started the mining industry buzzing about the trend to "Mexicanize": the Minister of the National Patrimony Ministry announced a possible new law that will make it easier for mining to be done by Mexicans; the Peñoles Company (American Metal Climax, Inc.) was reorganized to establish 51 percent ownership in a Mexican group; the Mexican government gained public notice by taking over a foreign electric utility.

Laboratory

Just as the mining industry must look to exploration to maintain its ore position, so must exploration look to field studies and the research laboratory to maintain its ability to find new ore deposits. A gathering wave of field studies by both private and public organizations bodes "good hunting" for exploration.

The Alabama Geological Survey made mineral resources studies in the watersheds of the Coosa, Tallapoosa, upper Black Warrior, upper Tombigbee, and Pea-Choctawhatchee rivers. The U. S. Bureau of Mines continued geophysical work on iron possibilities in southeastern Alaska, investigated tin and beryllium on Seward Peninsula, studied silver-lead deposits in the Ruby district, and did additional work on the mercury showings on White Mountain (Kuskokwim River region). The Arizona Bureau of Mines issued in December the final sheet of a series of county geologic maps. The United States Geological Survey now is assembling data from these maps preparatory to printing a state geologic map on the scale of 8.0 miles to the inch. Also, the Arizona Bureau of Mines is preparing a series of cross-sections to show rock units and structural features in the third dimension. These works will be a major contribution to the search for ore deposits in Arizona and adjacent areas. The Kansas Geological Survey in 1959 issued Bulletin 137, "Symposium on Geophysics in Kansas", and since has noted an increasing interest on the part of mineral-producing companies. The Kentucky Geological Survey is engaged in a 10-year program in cooperation with the United States Geological Survey to map the geology of the State.

The Missouri Geological Survey has responded to the intense exploration interest in that State and has in progress several studies designed to aid that effort: a report on the Precambian geology of Missouri is scheduled to go to press in 1961; the first in a series of aero-magnetic maps covering 3,680 square miles were issued in 1960 and the remainder are to be released early in 1961; the geologic map of the state is being revised, and it will be printed in 1961.

The Nevada Bureau of Mines and the United States Geological Survey in 1952 initiated a study of iron ore deposits in Nevada. The results of this study were to be published in three parts. Two parts have been published and the third is on open file. It is interesting to note in this

research and field studies are data from which new discoveries are made

instance that the time gap between field study and exploration discovery is shorter than the time required to complete and publish the work.

The New York Geological Survey is devoting all its effort to completion of a geologic map of the State. The Utah Geological and Mineralogical Survey is progressing with the Geologic Atlas of Utah; a geologic map of Salt Lake County has been published and a geologic map of Washington County is in press. The Washington Division of Mines and Geology completed a survey to determine the amount and quality of limestone deposits in both eastern and western Washington. It released a report of an airborne magnetometer and scintillometer survey that covered 1,000 square miles in northeastern Okanogan and northwestern Ferry counties. This survey is said to have prompted private companies to make similar surveys in Stevens and Pend Oreille counties.

The Ontario Department of Mines, in cooperation with the Canadian Government, completed an airborne magnetometer survey of 60,000 square miles in northewestern Ontario. The Geological Survey of Canada is carrying out geological investigations in a large part of the area. Negotiations are in progress to arrange a similar survey of 35,000 square miles in extreme western Ontario in 1961.

Federal, State, and Provincial agencies charged with the geologic function have amassed records and data on the geology of their areas of responsibility that cannot be matched by other organizations. This information is communicated to the public in a vast quantity of publications each year. Comprehensive presentations, when the data will permit, of the geologic conditions in the third dimension are commendable. Also, a reconstruction of the geologic conditions at a time closer to the formation of ore deposits than the present undoubtedly would be as interesting as the geologic conditions observed today.

The magnetometer survey is the geophysical method most universally applied in exploration and, consequently, it is the method for which the highest level of interpretative ability has been developed. The Jalander magnetometer is reported to be a technological advance in the measurement of magnetic fields and to have the advantages in field application of being small, "coat-pocket" size, requiring no tripod or orientation, and giving a nearly constant relative accuracy regardless of the magnitude of the anomaly because the absolute accuracy varies with the sensitivity range. The rubidium vapor magnetometer, now available in a research model from Varian Associates, holds promise in the development of a gradiometer, but its application to mineral exploration is not yet obvious.

The development of this high-sensitivity magnetometer turns thoughts toward the use of earth currents in mineral exploration. At least some thought is being given to the utilization of natural field electromagnetics at frequencies below the range of conventional instruments. The International Nickel Company received United States patents in 1960 for improvements to its airborne electromagnetic equipment. The refinements follow a decade of work by the inventors, and it is said that they make it possible to differentiate electrically conductive ore deposits from conductive bodies of water.

The trend in induced polarization is toward multi-frequency instrumentation. McPhar Geophysics Ltd. are offering a 6-frequency unit. Hunting Technical and Exploration Service Ltd. placed in field operation a new induced polarization unit with deep penetration capabilities. Much of the geophysical research by companies and institutions is devoted to the phenomena of induced polarization in the hope of learning to recognize characteristic differences between the response of disseminated metallic mineralization and other materials.

La Coste developed a successful airborne gravity meter that has been used in geodetic surveys. Hunting Technical and Exploration Services Ltd. and others are continuing research to develop an airborne gravity gradiometer for mineral exploration.

Geochemistry made significant contributions to exploration successes that are now moving toward mining operations. Its role in the Chief Oxide-Burgin project in the East Tintic district, Utah, was credited in the excellent description by J. B. Bush, et. al., in **Economic Geology,** vol. 55, nos. 6 and 7, 1960. Geochemical prospecting was instrumental in the discoveries of ore bodies at the Anderson mine in northeastern Washington. It has been used successfully in eastern Tennessee and other areas masked by a cover of residual soil.

A special department has been established at the University of Capetown, Union of South Africa, for the study and application of geochemisty. The Geochemical Prospecting Research Center of London is engaged in several experimental programs in central Africa that are investigating the dispersion of specific elements from mineralized bedrock and the possibility of producing geochemical maps analogous to geologic maps. The Geological Survey of Canada is initiating a program of routine geochemical mapping. There is a trend in the United States for public agencies to utilize regional geochemical mapping as an adjunct to regional geologic mapping.

Research in geochemistry is going forward on many fronts. Progress in both the development and application of geochemical prospecting is reviewed in the translation from Russian of Ginsburg's book on the principles of geochemical prospecting (Pergamon Press). Geochemical testing methods have been described for beryllium, readily extractable metal, copper, lead, and zinc.

An increasing number of studies are concerned with the distribution of ore metals in rocks associated with ore deposits. Isotopic studies promise to help elucidate the mechanism of ore deposition. Other lines of investigation deal with thermoluminescence, crystal chemistry, mineral synthesis, and geochronology.

Acknowledgments

The information included in this review comes from many sources. News items published throughout the year were supplemented by personal inquiries to Federal, State, and Provincial agencies, many private companies, contractors of exploration services, research organizations, institutions, and private individuals. It is not possible to mention all the events of exploration in 1960, nor to verify all that are mentioned here. It is regrettable that each source of information cannot be credited specifically. Nevertheless, the writer wishes to gratefully acknowledge the very fine response and assistance from all sources.

ORE DRESSING industry seeks

Circuit control and automation continues to expand in many minerals beneficiation operations. This trend may increase the importance of simple flowsheets such as all-flotation, as contrasted with gravity plus flotation, for applications such as lead or iron ore. Interest in grinding is high, more applications are noted for autogenous grinding and for vibratory ball milling. Hydrometallurgical and

PUSH BUTTON CONTROL changes ore bin feed and sample cuts in today's mill.

RECORDING CONSOLE, typical of types now used in flotation milling circuits.

Automation makes great strides in crushing, grinding, flotation, and other circuits

The Levack mill, a new, highly automated ore-milling plant, has been opened by the International Nickel Company of Canada in the Sudbury, Ontario, area. This modern $12,000,000 mill makes extensive use of instrumentation to permit centralized and, in some cases, automatic control of the crushing, grinding, flotation, and dewatering operation. An indicating and recording weightometer shows the tonnage of ore being crushed. The entire crushing and grinding operations are operated and controlled from central instrument panels. The density of the cone classifier overflow, which goes to flotation, is measured and automatically controlled by radioactive isotope instruments. Flotation process variables such as pulp density, temperature and alkalinity are automatically controlled by instruments located on a central panel. Similarly, the operation of the thickeners and filters is automatically controlled. This mill is a good example of how to cope with rising costs by increased production efficiency through technological advances.

A controlled uniform feed is now a reality rather than just a dream at two new concentrators. At the Viburnum, Missouri mill of St. Joseph Lead Company, the operator will be able to blend ores from three mines by pushing buttons. Ore from each mine will be crushed, assayed, and stored in separate silos.

In the new ore-blending system at the Eagle Mountain, California beneficiation plant of Kaiser Steel Company, the ore is placed in long piles by stacking conveyors which travel the length of the pile. A reclaimer digging wheel cuts a cross section of the pile and conveys this to the mill feed belt. This provides two averaging and blending occasions, the first as the stacker deposits material along the length of the pile, the second as the reclaimer cuts a cross section of the pile.

Complete automation of the density of the heavy media, long an objective in coal and iron ore preparation, is reported achieved for the first time in an installation at Lykens, Pennsylvania. In heavy-media separation of anthracite coal the medium is held to within ± 0.003 of the desired specific gravity with closed-loop control. The system is a collaborative development of Wilmot Engineering Company, Brown Instruments Division of Minneapolis-Honeywell, and Industrial Nucleonics Corporation. The basic principle of the system is the use of gamma radiation to measure the density of the medium. The specific gravity of the flowing water-magnetite medium to the detector is inversely proportional to the mass. Electrical signals from the radiation detector activate a recorder-controller which actuates motorized controls of (a) the value in the media bypass line, (b) the water addition, and (c) the magnetite addition. A controlling recording-ammeter measures the amperage drawn by the main belt feed-coal conveyor. The magnetite feed is shut down if the amperage indicates no load.

An automatic monitor for continuous analysis of coal is being tested by Simon-Carves Ltd. at Stockport,

more effective automatic controls

pyrometallurgical procedures, such as leaching beryllium, extraction of aluminum from shale and from anorthosite, amine extraction of lead, direct reduction of aluminum, and magnetic roasting or direct reduction of iron ores, to name a few, appear to be receiving more attention than physical beneficiation procedures.

Adam L. Wesner
Assistant Chief, Minerals Beneficiation Division
Battelle Memorial Institute
Columbus, Ohio

Great Britain. A sample of coal is directed into a box which is then filled with water. The box is scanned by gamma irradiation; the intensity of the scattered irradiation indicates the ash content of the sample. Another monitor, the Cendrex, made by the Dutch State Mines, is being tested by the National Coal Board of Great Britain. In this case, the relative absorption of X-rays indicates the ash contents of different coals. The X-rays are converted into visible light and activate a photo cell. The principle of radiation absorption is also being used in a new Soviet coal monitor which determines the ash contents of coals to within 0.5 percent. These new methods are steps forward in the modernization and automation of coal preparation.

The operators in the Anaconda Copper Concentrator in Montana obtain assays for copper in the flotation process products in just two minutes with an X-ray fluorescence analyzer. See MINING WORLD, December 1960, pages 32, 33, and 34. The pulp stream flows through a special sample holder and is irradiated with high-intensity X-rays causing fluorescence radiation which can be measured accurately to indicate the copper content. The problem that had to be licked was how to get a representative sample to the X-ray machine efficiently and quickly. It was finally realized that the pulp stream in the flotation circuit was the ultimate in samples. The prevailing turbulence gave a random distribution of solid particles, thus monitoring this existing pulp by X-ray was a good solution. A density gauge corrects for solids content and a computer combines this information with the X-ray readout to deliver the correct assays of feed, concentrate, and tailing.

Progress review of materials handling, crushing, and grinding

Although generally regarded as the cheapest form of materials handling, the belt conveyor has found limited use because the angle of inclination has been limited. Troughed belts and projections on belts have been used with limited success. The "Sandwich Conveyor" (or "LMG Steep Conveyor") designed and used at the Lubeck Works of Orenstein-Koppel und Lubecker Maschinenbau Aktiengesellschaft, is said to work at angles of 35 to 45° and to handle poorly sorted and wet material. A cover belt is placed over the top of the materials being conveyed, application of pressure rollers increases the maximum angle of inclination.

Another high-angle belt conveyor system using a new principle has been developed by a German company. An endless belt of flexible chain matting is laid over the load on the conveyor belt to prevent the material from rolling or slipping. The weight of the mat depends upon the nature of the material and on the conveying angle. The endless chain-mat moves at the same speed as the main conveyor belt, but it is itself carried independently by a supporting belt driven from a single drum unit mounted on the loading frame. In addition to covering the material and increasing the friction between the material and the conveyor belt by its weight, the chain mat assumes part of the conveying effort. When the conveyor belt is empty the chain mat simply lies on it and rotates with it. The angle of the conveyor belt can be altered at will. It has been found that incomplete loading or stopping have no effect upon the ability of the chain belt to hold the charge without slip.

An abrasion-resistant adhesive rubber sheeting for do-it-yourself covering of chutes, and launders, or patching of conveyor belt surfaces has been released by B. F. Goodrich Industrial Products Co. Known as Armorline, the material can be applied to metal, concrete, wood, and other materials almost as easily as a cold patch to an old type inner tube. Neither expensive tools nor special skill are required for covering or patching in the field.

Workers at the Geological Research Institute, USSR, report that lumps of iron ore can be broken into smaller pieces by placing them in a high-frequency magnetic field. Special contacts are placed at opposite ends of the boulder to produce localized heating that cracks the lump.

We may expect to hear more about hydroelectric rock breaking. Tests in the United States and Russia have demonstrated that high-voltage sparks under water can have an astounding shattering effect on rock, but perhaps at a rather low efficiency.

A portable crusher for open pit and quarry operations was described by J. B. Kochanowsky of Pennsylvania State University. There are many open pit mining and quarry operations where a mobile crusher arrangement could be more profitable than the facilities now used.

Crushing uranium ore containing 20 percent slime and a high percentage of clay proved uneconomic at the Maybell, Colorado mill of Trace Elements Co., because the material packed itself tightly in the conven-

tional equipment. Several schemes were tried and finally the problem was solved by converting to a special hammer mill. It has rotating elliptical bars set alternately in a row to screen undersized feed. A moving breaker plate and bar eliminate clogging.

In a study of the action in a rod mill, F. C. Bond of Allis-Chalmers found that rod mill efficiency as measured by the work index, reduction ratio, and power draft is seriously affected by broken rods in the charge and can be greatly reduced by the use of rods too small for the size and hardness of the ore particles. On the average, one large particle per foot of rod length is broken by each rod fall.

Investigations on the life and wear of the grinding balls under operating conditions in ball mills have been made by G. G. Eichholz of the Canadian Department of Mines and Technological Surveys. A lot of several thousand pounds of steel was prepared by adding a radioactive tracer to the melt. Balls made from this special steel were charged into an operating ball mill periodically over several weeks' time and were recovered with the use of a scanning device. The work indicated that the wear of the balls is proportional to their surface area. Studies are in progress by Battelle Memorial Institute on the wear of 12 types of balls being evaluated simultaneously in a 100-ton-per-hour mill grinding taconite. The balls are tagged by irradiation; recovery from the mill charge and separation into types is based on the level of radioactivity.

Bunting S. Crocker, of Kilborn Engineering Ltd., reviewed recent developments in autogenous grinding. He said that wet and dry primary grinding and secondary pebble milling are the three main lines along which autogenous grinding has progressed. Interest in pebble milling has been particularly high in Canada during the past year, and most companies that are now erecting mills have at least considered the use of ore pebbles for grinding. Since 1956, eight companies in Ontario alone have converted secondary mills to pebble mills or incorporated pebble mills in the original plant design. In six South African plants, 98 out of 105 primary mills are of pebble.

Results of grinding tests with an Aerofall mill compared with dry and wet rod mills were given by B. Fagerberg and H. Ornstein, of Luossavaara-Kiirunavaara AB. The work was done in a pilot plant on two low-grade magnetite ores of different character from north Sweden. They found that the Aerofall mill attains better liberation than rod mills and that both wear and power costs can be less in autogenous mills than in rod mills. They also stated that Aerofall mill products were closely sized and resulted in high concentration recoveries.

The pebble milling practice at the South African gold mine of Union Corporation Ltd. was described by O. A. E. Jackson. Steady progress in development of pebble milling in South Africa has established that the use of pebbles as grinding media is considerably less costly than use of steel balls or rods. Furthermore, the cost of producing suitable pebbles is unlikely to advance as fast as the price of steel grinding media.

A forum on grinding entitled "Ball Mills Using Steel Versus Pebble Mills" was conducted by the Canadian Institute of Mining and Metallurgy. Basic controversial issues relating to crushing and grinding were reviewed. Through a questionnaire mailed to all mill superintendents, data were collected and tabulated to show comminution costs and practices for most Canadian mills. Results of conversion from convention steel grinding to a semiautogenous operation at the Renabie Mines Ltd's. mill were given. Previous capacity was 500 tons per day and steel consumption was 3.9 pounds of steel per ton. Although the costs show a reduction, they are not as favorable as expected, for a variety of reasons.

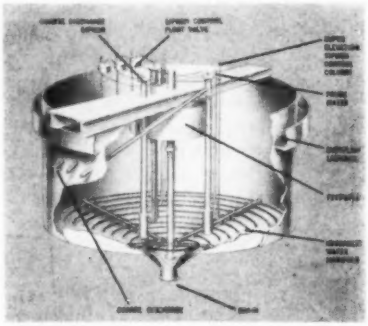
Vibrating mills are gaining in popularity and interest as the number of both new users and suppliers increases. These mills have a lower first cost and require less space and less grinding media than conventional mills. A 30-inch mill, powered by two 50-horsepower motors and suitable for continuous processing was introduced in 1960.

The development of the twin-motor drive for rotary grinding mills, and the dual eccentric mechanism system for vibrating ball mills allow the use of smaller motors than would be required if single drives were employed. Floor space is conserved on rotary grinding mills equipped with twin drives when compared to other gear box drive designs. Operation of twin-motor vibrating mills is so successful that all future vibrating mills made by Allis-Chalmers Manufacturing Company will use this feature.

Screens get bigger, cloth lasts longer, use sonic vibration for fine material

Improvements in screening in the United States have been directed toward larger size units and improved operations. Rima, a wedge-wire screen of stainless and carbon steels, has been introduced for screening, sifting, dewatering, sizing, washing, and filtering minerals. Thinner wire profiles not previously available permit more wires per working screen surface and greater screen capacity. Rubber clad perforated steel screens in sizes up to ½-inch steel thickness with a ¾-inch thick rubber covering, offer long wear and abrasion resistance. Increases in screen life on difficult and abrasive ores through rubber covered material are claimed to be as great as seven times.

In Europe, work on the application of sonic vibration for fine screening was reported by Paul Brühinghaus, and Benet Fagerberg, describes the L-screen used at the Luossavaara-Kiirunavaara plant in Malmberget. In the L-screen the decks consist of parallel, transverse rows of round rods, inserted in holes drilled in the side plates (and central beam) of the sloping, rectangular framework. The diameter of the rods is slightly smaller than the holes in the side frames, thus the rods can move freely when set in motion by a vibrator. The ore is fed to the top of the screen, the fines pass through the slots between the rods and the coarse passes over the rods down the slope. Blinding is prevented because of the vibration and rotation of the rods. The size of the screened fines decreases with increased slope of the screening surface.



SIPHONSIZER proves effective in iron ore flowsheets to raise concentrate grade.

A comparison between the operating costs for the previously used vibrating screens and the L-screen shows that L-screens are cheaper because the tonnage treated is higher and because the cost for maintenance is lower.

The Gravitational-Inertial classifier, developed by Buell Engineering Company, has been used for separation of minus-100-mesh fines from phosphate rock and for dedusting crushed limestone. The unit is heart shaped; the feed, carried by a high velocity air stream enters the top, slightly left of center. Coarser particles travel downward through the bottom outlet while finer particles are carried with the air stream as it follows a circular counterclockwise path and then crosses the inlet stream and exits through an outlet left of the feed entrance. The cut point is varied by regulating the air supply.

The SiphonSizer, a new product of Dorr-Oliver, is a hydraulic classifier for making two products in the 20 to 325 mesh size range. Classification is achieved by means of water introduced in the bottom of the tank, through nylon jets located on a series of pipe rings, and forms a teeter bed. At a predetermined point, siphons controlled by float valves automatically remove the coarse fractions, keeping the fluid bed in equilibrium.

New and better media for HMS circuits. Several new gravity concentrators, and one centrifugal separator developed

In commercial heavy-media plants using cone separators, airlifts or mechanical devices which are usually employed to remove the sink product generate currents that interfere with precise separation. P. Moiset, of the Polytechnic Faculty, University of Mons, and R. Dartois, of the University of Travail Charleroi, have invented a magnetic valve that eliminates such currents. A variable flux in this valve allows passage of nonmagnetic sink material with control of medium discharge. Comparative results on an African manganese ore are given to show that the valve reduces power consumption and improves separating efficiency.

Dr. Franz Rodis and Dr. J. Cremer of Knapsack-Griesheim AG, West German manufacturers of atomized ferrosilicon, report on 5 to 6 years of operating experience which has shown that the atomized ferrosilicon is superior to ground ferrosilicon for use as a heavy media. See MINING WORLD, March 1960, pages 36, 37, 38, and 39. The advantages shown by atomized ferrosilicon as compared with the ground type are as follows: (1) there is less corrosion because of the smooth spherical shape; this means means a lower consumption per ton of ore treated and also contributes to the ease in starting up after shutdowns; (2) lower loss of media by adhesion to the ore particles; (3) the smooth spherical shape causes less wear on pumps, launders, etc., and (4) with the spherical media it is possible to obtain a higher separating density because the viscosity of the suspension is lower when the particles are spherical. This leads to the speculation that we might find it practical to make separations at densities much higher than have been considered to date, perhaps at 4.5 or higher, particularly if a material of higher density is used such as spherical nickel powder. It should be mentioned that spherical ferrosilicon has a higher cost per pound than ground ferrosilicon.

The use and recovery of tetrabromoethane (TBE) in commercial float and sink separation was described by A. Baniel and A. Mitzmager of Israel Mining Industries. The recovery of TBE for reuse reduces the loss to less than 1.0 kilogram per ton of ore treated. They submit that the TBE now available from Dead Sea operations in Sodom is an effective new tool for mineral dressing.

J. Thompson of Kaiser Engineers states that Humphreys spiral plants can benefit in two ways from a new simple device called the "Counterflow Sizer"; higher recovery can be made from coarse feeds without the need for a jig or a heavy-media section and cleaner circuits can be reduced in size. The simple device contains no moving parts and requires only one control: a pinch valve operating on a small, low-pressure water line. Essentially, it is a hindered settling elutriation column similar to Richards Spitzkasten. The Counterflow Sizer is beneficial only if the feed contains a significant quantity of coarse, liberated, heavy minerals in the 8- to 28-mesh range. In a two-stage spiral plant the rougher spiral concentrate is passed through the pocket sizer. The underflow product is claimed to be almost pure heavy mineral, coarser than 28 mesh, requiring no further concentration. The overflow, which contains finer heavy mineral and somewhat coarser gangue, is treated in the cleaner spiral. Cleaner spiral concentrate then joins the sizer underflow as final concentrate.

A concentrating table of compact design has been achieved by Davies Magnet Works, Limited, London. The head motion is positioned centrally under the deck, thus the area occupied is scarcely larger than the deck area of 6 feet by 3 feet. The deck is faced with Linatex hard faced rubber with molded rubber riffles.

A mechanical gold pan which, it is claimed, will recover all the visible free gold in the feed and at the same time amalgamate any refractory gold without the use of reagents, has been developed by Mr. E. Foster in Southern Rhodesia for use in connection with clean up of old dumps at the Radnor mine on the Makaha Gold Belt. The device is patterned after a semi-mechanical gold pan which was used by the Incas toward the end of the 16th century.

The Department of Mines of Quebec reports a versatile centrifugal separator for separating light-weight particles of asbestos, sand, etc., from heavier particles with which they are mixed. The separator will select any given particle size or weight by adjusting the velocity and angle of the jet entry. It consists of two concentric metal containers interconnected by ports arranged spirally. Material to be separated is blown into the space between the two cylinders; the lighter particles flow into the central chamber, the heavier particles continue to the far end and to a separate chamber.

The Joyce-Martienssen concentrator has been developed by J. R. F. Joyce Ltd. for the treatment of sun-dried sand deposits. The essential principle is that dry granular material flowing at an even velocity down an inclined trough tends to form layers in which the heavier particles collect nearest the surface of the trough while the lighter particles rise above. At intervals the trough is pierced by a pattern of holes of such shape and aperture that heavier particles can pass through while the lighter and upper section of the bed are supported and pass on.

Iron mineral flotation studies show promise

S. R. B. Cooke of the University of Minnesota and A. F. Colombo of the U. S. Bureau of Mines have collected fundamental data and general information on the floatability of goethite. Vacuum flotation, contact angle measurement, and simplified flotation tests with a modified Hallimond tube were used and the experimental results were correlated with the electrokinetic properties of geothite as determined by streaming potential measurement. The isoelectric point of goethite occurs at a pH of 6.7. At pH values below 6.7 the goethite surface is positively charged. Thus, anionic collectors are effective. At pH values above 6.7, the surface is negative and cationic collectors are more effective. A similar situation exists with quartz except that the isoelectric point is at a pH of about 2. The optimum flotation of goethite from quartz using sodium dedecylsulfate was found to occur at a pH of 1.0 to 3.5. The optimum flotation of quartz from goethite using dodecylammonium chloride was found to occur at a pH of 5.5 to 7.5. Although a small quantity of goethite slimes (0.5 percent) was found to completely inhibit the flotation of quartz, a relatively large quantity (5.0 percent) appeared to have little effect on the flotation of goethite.

Smith-Douglass Company has changed its flotation process for phosphate rock. In the conventional phosphate flotation the phosphate is activated with fatty acid plus fuel oil and is removed in the froth. The silica sand remains in the underflow. Because of entrainment the froth so produced contains too much silica. Thus, retreatment is necessary; this consists of a step to remove the fatty acid collector from the froth after which the silica is floated using an amine as collector. In the Hollingsworth-Sapp process the two steps are reversed. The silica is floated first with an amine reagent and in the second step the phosphate is floated with fatty acid. Removal of the amine reagent before fatty acid flotation is not necessary. Key to the success of the new process is the Hollingsworth flotation cell which is air operated and has no moving parts. Thus the cell produces a minimum amount of slimes although good agitation is obtained for effective use of reagents.

In his studies of flotation by gas precipitation, V. I. Klassen of the Academy of Sciences, USSR, concludes that generation or precipitation of gas bubbles and their discharge from solution may considerably increase the efficiency of a flotation process. It appears that bubble formation takes place in mechanical flotation machines to a much greater degree than is generally believed but it is especially pronounced in vacuum flotation, a fact which is too often forgotten.

The effect of temperature on soap flotation of iron ore was discussed by S. R. B. Cooke, I. Iwasaki, and H. S. Choi of the University of Minnesota. Comparative results were given at room temperature and at elevated temperature by otherwise conventional flotation of iron ores, by single mineral flotation in the Hallimond tube and by contact-angle measurements. Preliminary calculations show that the cost of flotation at elevated temperature should not be excessive and that gains to be realized may well outweigh the extra cost of heating the pulp.

The response of flotation of beryl in a high-grade berylliferous pegmatite containing 4.35 percent BeO from Wodgina, Western Australia, has been reported by W. J. Trahar, University of Melbourne. Recovery of 80 percent of the beryl was attained in a saleable grade and it is thought that this can be improved. The literature of beryl flotation was reviewed and the functions of various reagents were discussed. It was concluded that the procedure established by the U. S. Bureau of Mines is not necessary for the separation of beryl from this ore but is likely to be of value for very low-grade ores.

A patent was issued to Kennecott Copper Corporation as the result of work conducted to recover "oxine" (8-quinolinol) economically from flotation pulps for reuse. The investigation was made by Dr. A. W. Last, chief, and Mr. K. F. Marquardson, a senior scientist in the Ore Dressing Section. This reagent recovery process would be used in conjunction with concentration of columbium minerals by froth flotation which uses oxine as the mineral collector. The cost of oxine is a major processing item, thus the patented reagent recovery process will decrease substantially the over-all reagent cost and thereby contribute to the economics of processing carbonatite-pyrochlore deposits for the recovery of the contained columbium.

After many years of trying to cope with a complex arsenopyrite-pyrite gold ore with lead and silver values, the Northern Milling Company recently put a new mill into operation near Townsend, Montana, that has finally licked this tough metallurgical problem, reported W. R. Wade. In the past, at least seven mills have been built in the district attempting to treat the arsenosulfide ores. All failed to make economical recoveries when treating the massive arsenopyrite-pyrite gold ores that occur under the oxide zone. Northern Milling is now making high-grade gold concentrates with a low content of arsenic. The procedure consists of flotation at pH 8.5 using lime, soda ash, sodium sulphite, and amyl xanthate to produce a rougher concentrate. The rougher concentrate is cleaned with the addition of potassium permanganate. It has been found that the amount of amyl xanthate is critical.

The Sullivan concentrator pilot mill at Chapman Camp, British Columbia, was described by R. M. Lauer. The pilot mill provides a valuable intermediate step between the laboratory and the mill. It avoids the losses incurred when unsuccessful full-scale tests were attempted and conversely it provides assurance that full-scale flow changes can be made without serious hazard. A capacity of 100 tons per day was selected as the minimum size to permit incorporation of commercial size equipment for steady, reliable operation. Crushing and sink-float units were omitted from the layout.

Installation of flotation and Fluo-Solids roasting facilities at San Francisco Chemical Company's property at Leefe, Wyoming, has enabled that company to produce specification phosphate products from ores heretofore considered uneconomical. The company treats 1,000 tons per day of low-grade and carbonaceous ores obtained from open-pit and an underground mining operation. It is important that high-grade rock which is to be acidulated for fertilizer manufacture be free of hydrocarbons.

Flotation of Pacific Northwest chromite ores was reported by G. V. Sullivan and W. H. Stickney of the U. S. Bureau of Mines. Conventional methods of flotation resulted in low chromium recoveries because the ores used in this investigation were of the fine-grained disseminated type.

NEW GRATE-KILN pelletizing system was first used for iron on commercial scale on specular hematite flotation concentrate by Humboldt Mining Company, Michigan.

Pelletizing

The grate-kiln pelletizing system of Allis-Chalmers has been put into operation in several more plants during the past year. Among the newest installations are the Humboldt mine plant of Cleveland-Cliffs Iron Company near Ishpeming, Michigan, where hematite is converted into a heat-hardened pelletized concentrate, and the Dow Chemical Company plant at Ladington, Michigan, where limestone is calcined. This system has also been demonstrated on the pelletizing of phosphate sand as well as calcining of magnesite and bauxite.

N. B. Melcher and M. B. Royer described preliminary experiments by the U. S. Bureau of Mines on the practicability of adding raw pellets of taconite concentrate to blast furnace feeds rather than the usual industrial practice of heat-hardening the pellets before charging into the furnace.

Recovery by magnetic and electrostatic separation

F. D. DeVaney of Pickands Mather & Company discussed new developments in the magnetic concentration of iron ores. Recently, there has been an enormous increase in the use of various types of magnetic separation devices for the concentration of iron ore. The magnetic separators used are of advanced design. The development of large, new iron deposits in Labrador promises to increase the scope of magnetic concentration still further. Some of these ores consist mainly of clean specular hematite for which high intensity and high-tension separators should prove suitable. DeVaney also discussed the use of dry magnetic separators for concentrating fine sizes of ore.

Union Miniere du Haut Katanga recovers, by magnetic upgrading, a portion of the germanium in a copper germanium "concentrate" from its Kipushi mine ore. The germanium occurs as renierite, a ferromagnetic mineral, similar to germanite in chemical composition but higher in iron and lower in germanium. The selective copper flotation concentrate is enriched in renierite and this selective concentrate is separated magnetically in Frantz Ferrofilters. The feed to magnetic separation contains about 0.1 percent germanium, magnetic concentrates contain from 0.4 to 0.9 percent, the recovery is approximately 20 percent of the germanium in the feed to magnetic separation. See MINING WORLD, January 1960, pages 34 and 35.

The new Roto Flux separator by Dings Magnetic Separator Company is a 400-cycle AC belt type dry magnetic separator which has coils mounted above a main conveying belt. The coils are encircled by their own belt which helps transport the magnetic material. This AC separator is suited for extremely fine material such as fly ash.

Oriented barium ferrite has been utilized in developing improved permanent magnets. This material is said to provide a higher strength per weight ratio than Alnico V at a lower cost.

The Jones wet magnetic separator for feebly magnetic minerals operates on an automatic cycle which includes (1) collection of magnetic particles from the feed or grooved plates in a magnetic field (2) cleaning of the magnetic particles from the plate by a decrease in magnetic field strength together with an increased water velocity. The frequency is 10 to 15 cycles per minute. Results of experiments performed at the Mines Branch, Ottawa, indicate that the Jones separator not only effects very sharp separations of plus-100-mesh sizes but is also effective on very fine materials ranging from high to very weak magnetic susceptibility.

The first International Colloquium on the Principles and Application of Electrostatic Forces was held at Grenoble from September 27, to October 1, 1960. A summary of the opinion of most of the delegates in regard to the use of electrostatic concentration for mineral separation might be that no one uses electrostatic concentration until all other methods have failed. It was thought that research and development of new machines would lead to a wider use of this method of concentration.

In a report on the concentration of beach sand minerals from Yoganup, Western Australia, S. B. Hudson discussed the difference in the principle of operations between the high-tension roll-type electrostatic separator and the plate-type or conductance separator. Test work showed that a substantial portion of the leucoxene could not be separated from the nonconductor in a high-tension separator because the leucoxene was not sufficiently conducting and was much finer than the coarsest nonconductors. The voltage required to pin the coarsest nonconductors (such as quartz and zircon) was sufficient to pin much of the leucoxene. In this conductance separator, however, this size difference is an advantage because the fineness of the leucoxene caused it to be more readily attracted towards the electrode. At the same time, however, the very fine nonconductors were also attracted, and it was found necessary to employ high-tension separation to separate the leucoxene from the fine nonconductors. In summary, in order to obtain relatively clean ilmenite and leucoxene concentrate from the sample investigated by electrostatic

means alone, it would be necessary to use high-tension separation to produce a highly conducting ilmenite-rich concentrate, a fairly large middling product, and a small tailing containing the finest nonconductors. Conductance separation would then be required to recover the leucoxene from the high-tension middling.

I. A. Kakovsky of the Urals Polytechnic Institute and V. I. Revnivtzev of the Research Institute Uralmekhanobr have studied the effects of surface conditioning on the electrostatic separation of minerals of low conductivity. The conductivity of minerals depends largely on the humidity of the air surrounding them. The basic factor of complete conductivity of dielectrical minerals is the surface conductivity but in damp air, this is determined mainly by the quantity of water absorbed on the particular mineral surface.

Float resin and two-stage leach for U_3O_8

The development of a new resin-in-pulp process for extracting uranium from acid-leach pulp is described by E. H. D. Carman of Goldfields of South Africa, Limited. The resin floats freely at the surface of the pulp in each stage of a continuous counter-current ion exchange plant. The acid-leached pulp gravitates from stage to stage while counter-current movement of resin is achieved by means of mechanized transverse scoops.

The processing of uranium ore concentrate and recycle residues to purify uranyl nitrate solution at Springfields has been described by H. Page, L. P. Shortis, and J. A. Dukes of the United Kingdom Atomic Energy Authority. The uranium ore concentrates are dissolved in nitric acid in a multistage system. The resulting solution is filtered on precoat rotary vacuum units and finally purified by a solvent extraction process employing multistage mixer-settler box contractors. A similar integrated process has been developed for recycle streams of solid residues. The processes are virtually fully continuous and centrally controlled. The plan has been in successful operation for some months but potential improvements for future plants are being pursued.

The regeneration of cobalt-poisoned ion-exchange resins and their subsequent performance in the uranium recovery plant at West Rand Consolidated Mines Ltd. was described by E. A. Nugent, T. Hoogervorst, and R. E. Wheeler. The progress of this development work through the laboratory and small-scale regeneration plant is given in detail, together with an evaluation of the operating characteristics of the regenerated resins.

A two-stage leach has been incorporated into the mill flowsheet at Texas-Zinc Minerals Corporation's uranium mill at Mexican Hat, Utah. The leach feed is split into two fractions, slimes and sands. The thickened slimes are fed to the head of the leach circuit where the acid is added. The sands are added later in the leach circuit, whereupon leaching continues with no further addition. By this procedure the slimes, which require more intense leaching than the sands, are subjected to a longer time at a higher acid concentration. The over-all recovery by leaching is thereby increased. A patent application has been filed on this process.

Workers at the Warren Spring Laboratory of the Department of Scientific and Industrial Research at Stevenage, England, report the application of a liquid-liquid extraction technique to recovery of copper, nickel, cobalt, zinc, and manganese. The process is similar to that used for recovery of uranium except that cheaper reagents are required than the alkyl phosphoric acids used for uranium. Promising results are reported with naphthenic acid.

Use many vacuum belt and top feed filters

D. A. Dahlstrom of the Eimco Corporation reports that the use of endless belt vacuum filters has increased greatly during the past year; in most cases they have either eliminated a severe blinding problem or increased recovery of soluble values by improved washing of the filter cake. The cloth is made endless by use of a zipper so that one man can change a cloth on a large filter in one-half hour, as compared with two men for eight hours to change cloth on a conventional filter.

Top feed filters have been successfully tested for dewatering coarse iron concentrates from Humphreys spirals and for concentrates as coarse as ½ inch. Then coarse particles, which cannot be handled by conventional drum or disc filters can be dewatered to as low as 3 percent H_2O.

Other reports

A. A. Linari-Linholm of Diamond Research Laboratory, Johannesburg, South Africa has developed a new separator to recover diamond from gangue. The separator utilizes the optical properties of the diamond, particularly when of gem quality, to refract and transmit light whereas associated gangue is relatively opaque. An endless belt transports the mixture of diamonds and gravel through a light beam, then an electronic detector picks up the flash of light from the diamond and actuates a mechanical deflector to divert the diamond from the stream of gangue material.

The first commercial unit employing the new thermoadhesive method for dry separation of minerals has been installed at International Salt Company's Detroit mine. The new process, developed at Battelle Memorial Institute, consists of exposure of crude rock salt to radiant heating which heats the impurities more than the salt. The impurities are removed because they adhere to a heat-sensitive coating on a conveyor belt. The Detroit plant, which has a capacity of 35 tons per hour, is completely automatic and requires no attention other than periodic maintenance checks. The total cost of operation is 33 cents per ton of cleaned rock salt.

Re-examination of the segregation process continues. The U. S. Bureau of Mines is operating an externally fired rotary kiln on a semi-commercial scale and a similar pilot plant is in operation in Mauritania at d'Akoujt mine. A pilot plant is also in operation at Berenguela mine in Peru. At Berenguela most of the copper is not present as recognizable minerals but is associated with manganese oxides. The mixed charge of ore, coal, and salt is finely ground, pelletized, and calcined in a multi-shaft furnace, the pellets being heated by direct contact with combustion gas. The calcine is then quenched in water and ground lightly and the copper is separated by flotation.

A new finishing step developed at the Golden Cycle Corporation's mill at Victor, Colorado, has boosted economic recovery by $6,000 per month. Flotation tailing is treated with cyanide, the gold is absorbed on charcoal and then dissolved in a caustic-cyanide solution. This solution is fed to a specially designed electrolytic cell wherein the gold plates out on stainless steel. The cathode of the cell is a perforated rubber basket covered with first a layer of stainless steel wire mesh then with steel wool.

EUROPEAN ore dressing stimulated by London conference

Pierre Gy
Technical Manager
Minerais et Métaux
Paris, France

The year 1960 will certainly be recorded as the year of the London Mineral Dressing Congress, attended by the more famous personalities of the ore dressing world. The success of this meeting was such that several countries were willing to organize the next congresses. France was chosen to hold one early in 1963, and the United States late in 1964. The USSR also offered to invite the metallurgists to meet in Moscow two or three years later.

This shows the importance given by the national representatives to these international manifestations where professors, scientists, and engineers from all over the world can meet and exchange their experiences.

The proceedings of such a congress constitute a cross section of what was going on in ore dressing in Europe during the two or three years preceding the opening session. In its June issue, MINING WORLD commented on this congress and the reader will find there the information he is looking for on this subject.

To summarize the trends of the year we note the importance of the research work, fundamental as well as applied, carried out in nearly all the branches of minerals beneficiation.

In the field of iron ore concentration, new plants have been put into operation because the reserves of high grade ores are running low. Europe's steel mills will treat more and more concentrates from domestic mines, together with high grade ores from foreign mines (particularly African).

As far as nonferrous metals are concerned, it is of first importance to note that the activity in the field of lead and zinc has been considerably slowed down by the crisis in the market, whereas in the field of copper and cobalt the political chaos of the ex-Belgian Congo has not prevented the Belgian engineers from carrying on their project and research work.

New plants have been put into operation during 1960 for phosphate rock, iron ore, ilmenite, potash, fluorspar, etc.

Research is growing steadily. Carried out mainly by universities or state agencies, it covers all the branches of ore dressing and nearly all the countries of the European area. Governments and private companies understand more and more that research is the key to the future.

Whereas USSR scientists such as Plaksin, Ejgeles and coworkers specialize mainly in the theory of flotation, the research carried out in Great Britain, Belgium (Congo), France, and Sweden is dealing more with actual problems. In Germany new collectors for hematite slimes are under study.

Grinding, especially supercritical grinding and autogenous grinding, is under study in Finland (Professor Hukki), France (IRSID, grinding of iron ores), Sweden etc.

In hydrometallurgy, the use of naphthenic acids has been considered with success in England (Warren Spring) for the separation and recovery of common metals by liquid-liquid extraction. In Katanga (Congo Republic) a new process for recovery of cobalt and copper by leaching, purification and electrowinning has been developed by l'Union Minière du Haut-Katanga working with a Belgian University.

In classification, a new wet sizing apparatus has been developed by Hukki in Finland. The so-called "screening cell" is reported to have a very high screening capacity in the minus-1-millimeter range, down to 0.1 millimeter (between 10 and 100 tons per square meter of screen area per hour).

The screening efficiency is claimed to be far superior to that of conventional classification (mechanical or centrifugal). We look forward to reports of industrial results of this screen.

Iron ore concentration. Research work has been carried out in France (study of new concentration plants mainly by high intensity separation), in Russia (low intensity separation of magnetite-quartzite ores), and Sweden (spiral and low intensity concentration; agglomeration of flotation concentrates). The problem of sintering flotation concentrates seems to have been solved. In western Europe, the development in this province of ore dressing has been slower than expected. Plants have been erected in Scandinavia, East Germany, Poland, Czechoslovakia, and above all in Russia, where plants having a capacity of 5,000,000 to 10,000,000 tons of concentrates per year are now operating.

An electrostatic separation Symposium was held in Grenoble (France) in September 1960 on the theory of the application of the electrostatic forces to industrial problems and particularly to the separation of minerals. This was the occasion for scientists from the United States, USSR, Great Britain, and France to present the results of studies made in their respective countries. It must be said that the theory of the electrostatic separation of minerals is far from being definitely established.

New processes. I mentioned last year in this annual review that a new gravity process involving electrical forces had been discovered by Micheletti in Italy. We have received, in 1960, no information about the application of this process to industrial problems.

Other research programs were carried out in Torino and Cagliari, also in Italy, to develop new methods of concentration. It is too early to speak of the first one but in Cagliari (Sardinia) a new gravimetric apparatus, the rotating pipe (tubo ruotante) has been described by Dr. Ferrara for the concentration of –1 or –2 mm material. The results presented by the author seem very interesting and we will wait for the disclosure of industrial results.

In Germany, an interesting study is being made on the flotation in a field of electrical forces, and is reported to give applicable results.

Sampling. More and more attention is being paid in Europe, chiefly in France, to problems of ore sampling. All the new plants of some importance are designed with automatic sampling devices, and in many ancient plants the control systems will be re-studied.

MINE OPERATORS cut costs by

A growing awareness of the absolute necessity for cost reduction began to permeate the mining industry in 1960. World unrest, ideological conflict, the simultaneous concern for disarmament and increased armament helped to create a revitalized concern with regard to mere survival in a world grown sharp with competition of all kinds. On the level of economic competition in mining, temporary oversupply of some metals coupled with the accelerated emphasis on technological improvements and the disparity in wage levels in various parts of the world have combined to force many segments of the mining industry, particularly in the United States and Canada, to consider anew whether or not all of the tools available for reducing and controlling costs are being utilized.

As a measure of the competition, let us consider Nchanga Consolidated Copper Mines Ltd., one of the world's lowest cost producers of copper. Blessed with a high grade ore body augmented with modern mining methods, Nchanga management nonetheless uses an industrial engineering work study department of over 70 persons to further reduce costs through improved use of materials, manpower, and machinery.

Mine managements all over the world—in North and South America, in Europe and Africa, in the Soviet Union and the Far East, and in Australia—have been using industrial engineering increasingly in the battle against cost. It is a tool no less effective than technological improvements. In many cases, it is more effective. In the future, more and more will this tool be used because it is effective in controlling costs wherever they originate. It is a tool that can be applied to the whole cost picture. And where some mining companies use it, the others must follow.

Industrial engineering is a many-faceted tool. Its scope is large because it is directed at costs wherever they originate. It is becoming increasingly sophisticated, employing such techniques as operations research, which basically is the study of a problem by looking at the whole system and determining in an engineered fashion the interrelation of the parts and the relation of each part to the whole.

Operations research frequently employs a mathematical approach to the solution of mining and management problems. This automatically leads to the use of computers in the solution of many of these problems. Already computers have been used to solve such problems as calculating ore reserves, the economic limits of open pit expansion, the optimum use of shovels and draglines, haulage schedules, ore blending, production scheduling, quality control, production standards, predicting ore recovery, in surveying, and in mining and metallurgical research, to name but a few. The potential use of computers is limited only by the supply of mining problems —which are many and varied.

A number of papers on the use of computers in mining have appeared in late years. At the University of Arizona's "Symposium on Surface Mining Practices" in October, one of the four technical sessions was devoted to the use of computers. See December 1960 MINING WORLD, pages 22 to 25. (From April 4 to 7, 1961, a four-day short course on computer applications in the mineral industry was given on the University of Arizona campus.)

The emphasis on cost reduction has naturally lead to accelerated educational programs. Increasing numbers of mining men attend such courses as the American Management Association's "Cost Reduction Course" at Los Angeles, California in December. Here one of the featured presentations was by M. J. O'Shaughnessy, Assistant general manager of Kennecott Copper Corporation's Nevada Mines Division, who described the Nevada Division's effective cost control program. Others

Underground mines drill with new machines and smaller bits;

There are several new airleg drills on the market that promise faster drilling speeds, and reduced drilling cost. These include the Finnish Tampella T10C, Thor 330, Ingersoll-Rand JR-300, Gardner-Denver FL63, and Holman Silver Thirty-Three. Several have indicated 60 percent faster penetration as compared to older production drills. Some of the features include retractable legs, larger bores, more blows per minute, grouping of controls, and shorter stroke. In Butte, a test Tampella drill has been modified to take a telescopic leg with resulting increased overall drilling rate.

Delnite Mines Ltd. in Ontario, Canada, and Hecla Mining Company in Idaho are successfully using 1-inch carbide bits with ¾ inch hex steel to improve penetration rates and reduce costs. Delnite has reduced drill costs 42 percent, bit costs 50 percent, and explosive costs per ton 20 percent. Delnite has also developed a 1⅞ inch reamer bit used in conjunction with the 1 inch bit. These holes can be drilled faster and with less wear on the equipment than by drilling them in one pass. They are used to provide greater space for the initial blast. Delnite uses ¾ inch, 80 percent powder, while Hecla uses ⅞ inch, 60 percent.

At Idarado Mining Company close study of drill steel life and drilling practice has resulted in increasing drill steel life six times, increasing productivity, and decreasing machine maintenance cost. Simple methods of recording mine drill steel uses permit evaluation of drill steel in production.

Continuing drilling research by International Nickel Company of Canada has revealed that the point at which repair of drills becomes uneconomical depends almost entirely on cylinder wear, confirming tests by other companies. In some cases chrome plating of worn cylinders to original size has meant several more years of life to the drill. A drilling truck with five airleg machines has been developed to accelerate drift advance. The use of jumbos required constant attention to maintenance but with the truck, machines can be quickly replaced.

Ladder drilling, developed in Sweden, promises higher output per man hour in tunnel work. Drills with pusher legs are mounted in cradles on steel ladders which extend to the face. Full feed power is assured, collaring is simplified, one man can operate two drills, longer steel can be used, and drilling accuracy is increased.

Ingersoll-Rand has developed a down-the-hole drill for underground

mechanization, industrial engineering

by Richard M. Stewart, Director of Mining Research
The Anaconda Company, Butte, Montana
and
Stewart W. Hurlbut, Staff Industrial Engineer
The Anaconda Company, Butte, Montana

R. M. STEWART

S. W. HURLBUT

attend the University of California's 10-day Engineering and Management Course given both at Berkeley and Los Angeles. Here such immediately applicable courses as administration of industrial engineering departments, work simplification, operations research, materials handling, the economics of equipment replacement, and many others are given by top men in their field. A two-week management training course for mining personnel was held in Toronto, Ontario, in February, 1961. The program was devoted to scientific management employing industrial engineering in such aspects as work study, method improvement, work planning and production control, warehouse and inventory control, systematic maintenance, incentive systems, data processing, and others.

On a more local basis, increased emphasis is being given to training sessions in which line and staff personnel are taught industrial engineering techniques to use in their own jobs as well as to provide understanding of industrial engineering objectives. The Hecla Mining Company of Wallace, Idaho recently concluded a training program wherein all line supervisors were instructed in industrial engineering techniques for a full-time, two week period. The Anaconda Company in Butte sponsored a two week industrial engineering workshop in January, 1961, for staff and line personnel from its Montana operations. Presentations included the setting of underground standards, responsibility accounting, scheduling techniques, automation in mining, supervisor training, work simplification, materials handling, and others.

The above serves to emphasize that industrial engineering techniques to reduce costs are not the sole prerogative of industrial engineering departments. In effective cost reduction, industrial engineering must be a way of life for all personnel involved. Detailed studies must be made by industrial engineers, but broader aspects can be practiced by all staff and line personnel.

The continuing trend toward increased or improved mechanization, instrumentation, automation, and re-research was noted during 1960. There were many innovations and equipment and method improvements during the year. There were improvements in all phases of mining that can not be safely ignored by progressive mining men. This article does not encompass all of them. Those included are considered by the writers to be outstanding or indicative of trends.

use perimeter blasting and slurries; now several types of Trainloaders speed drifting at lower cost

use. Six inch holes can be put down rapidly from level to level with a considerable degree of accuracy. These can be used for hydraulic fill, cables and pipes, drainage, or for raise rounds. Considerable reduction in cost compared to diamond drill holes has been experienced. Trials in Butte indicate that an average drilling rate of 15 feet per hour can be achieved in medium ground.

Perimeter blasting—a technique for minimizing overbreak and shattering of walls—is undergoing extensive testing in Canada. Since it produces smooth walls and backs, scaling time is decreased, as well as friction in airways. Application in stopes is also being studied. The outside holes of a round are loaded with Xactex powder which comes in cartridges ⅜ by 24 inches and can be coupled together with sleeves. The holes are fired simultaneously at the end of the blast so that the ground shears from one hole to the next. Spacing, burden, and hole alignment are of importance and the collars of the holes must be stemmed. Occasionally, a stick or two of standard explosive is required in some holes.

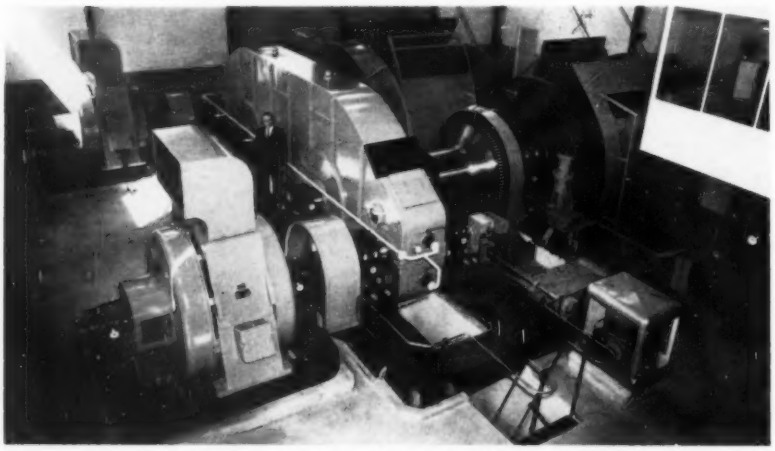
Explosives cost reduction through the increasing use of ammonium nitrate and fuel oil in small diameter holes underground continues. Salt, potash, iron, limestone, and lead-zinc mines are now using this explosive on a production basis. That its use will spread to other mines, there is no doubt. The basic problem of hole loading has been solved by the construction of several different types of pneumatic placers. Storage and placing under wet or humid conditions remain a problem but are yielding to experimentation. Fume testing remains a subject on which more information is required before all types of mines can safely use AN/FO underground.

The use of slurried ammonium nitrate mixtures underground is being investigated by several mining companies including The Anaconda Company. Initial results indicate that their use will be confined to exceptionally hard ground to be economically justified.

Trainloaders are making increasing contributions to lower cost tunnel driving. A new type has been developed in Northern Rhodesia at Nchanga where a single train loads a 12 by 14 by 14 foot round. Six 25-

ton Gregg side-tipping tray cars are equipped with individual conveyors mounted on bogies. An Atlas Copco LM 200 loader fills the train in less than 80 minutes. A gantry frame lifts the conveyor free of the cars at the tipple.

Coeur d'Alene Hardware and Foundry Company trainloaders have been used at the Sunro, Madsen Red Lake, and Brittania mines in Canada and at the Republic mine in Washington with 115 to 125 cubic foot cars. C. S. Card Iron Works Company has developed a slusher train for Standard Metals Company at Silverton, Colorado featuring 200 cubic foot cars. A. J. Cheff Construction Company has been using two trainloaders in the Nooksak tunnel project near Bellingham, Washington. Dorr-Oliver-Long and Sanford-Day Iron Works Company have also developed slusher trains. Canadian Refractories Ltd. at Kilmar, Quebec has developed an overhead conveyor loader suspended on a monorail. The



NEW BLAIR multi-rope hoist at President Brand Gold Mining Company's No. 3 shaft hoists larger loads from deeper levels with smaller ropes.

Underhand hydraulic

One of the most significant innovations in hydraulic fill practice since Kerr-Addison Gold Mines developed the settled storage tank principle, is the use of mined-out rock bolted stopes for settled storage at Dome mines near Timmins, Ontario. The tailing is classified on surface and passes to the stope through diamond drill holes. There the tailing settles out and the excess water is decanted off. The bottom of the stope is fitted with a concrete plug, discharge pipes, and internal fluidizing water pipes. When tailing is required for fill on levels below, the internal water pipes are turned on, and the tailing flows through the opened discharge valve into a collector where more water is

Faster tunnel driving and shaft sinking now routine

Loraine Gold Mines Ltd. in Orange Free State achieved advances of 1,399 and 1,296 feet plus 337 in crosscuts and service bays during March of 1960. The 12 by 10 foot headings are a main haulage and a return airway.

At Nchanga, a 14 by 14 foot haulageway was advanced 1,248 feet in July, plus 30 feet of side-room. An average of 12 feet per 6 hour shift was achieved with 16.5 feet being the highest. The principal contributory factor was the use of the cleaning train described under Mucking. At the Panel mine near Elliot Lake, Ontario, a best month advance of 1,025 feet with 23 of side-room was rung up in a 9 by 10 foot heading. The average advance was 10.4 feet per round or 33 feet per day. The maximum advance was 48 feet in one three-shift day. Mucking was by an Eimco 40 mucker with conveyor and 140 cubic foot Granby cars. The five-man crews—a leader and four miners—changed shifts at the face. Overall costs including completely equipping the drift averaged $80 per foot.

The big news in shaft sinking came again from South Africa where, in October, a new world's record of 1,106 feet in 31 days was achieved in the No. 4 shaft of Hartebeestfontein Gold Mining Company in the Klerksdorp district. The circular shaft has a concrete-lined finished diameter of 24 feet and a planned final depth of 7,500.

Improved equipment and techniques contributed to the record but as always with these phenomenal sinking rates achieved in South Africa, the chief ingredient is a combination of planning and teamwork.

A 30 cubic foot pneumatically operated cactus grab was used with 14-ton buckets, the largest ever used, to achieve an average mucking rate of 280 tons per hour. Drills were 127 pound Seco S27 machines using rubber-collared 1⅛ inch steel. Different grades of tungsten carbide tips were used to suit the various ground conditions. Powder was 74 percent, 1½ by 22 inches, which required fewer holes. A closed circuit TV camera was used at the collar to indicate to the hoisting engineer if the buckets were dumping clean.

But records are made to be broken and Mr. Martin Tucker, shaft supervisor for Hartebeestfontein, predicts that a footage of between 1,300 and 1,500 feet in a month is possible using present equipment and techniques.

Vaal Reefs Exploration and Mining Co., Ltd., after breaking the shaft sinking record in 1959 with advances of 922 and 934 feet, hung up a new sort of record on September 8, 1960, when it bottomed its No. 2, 26 foot finished diameter, main shaft at 7,052—just over 13 months after full-scale sinking started. This is the deepest single lift shaft in existence. During approximately the same period, a 20 foot finished diameter ventilation shaft was sunk to 6,865 feet. The two represent a prodigious amount of rock broken and hoisted —in excess of 600,000 tons.

An electrically operated shaft mucker was used in the No. 2 shaft and an Eimco 630 in the ventilation shaft.

In the United States, shaft sinking using rotary drill and reaming equip-

belt is loaded by an Eimco mucker and discharges into 3-ton Granby cars.

The Blair mucker has recently been developed in South Africa for operating in stopes with restricted headroom. Twin 3.5 horsepower air motors are used to drive the mucker along parallel steel cables strung between the face and rear of the stope. The cables have three wraps on the drive drums of the mucker. A slewing angle of 60° is achieved by independent operation of the drive motors. The mucker can be mounted on skids, wheels, or tracks, hence has possible application to a slusher train operation.

At Calumet and Hecla Inc.'s Marquez mine, an Eimco 630 electric loader was modified to permit remote control. It was developed to facilitate loading broken ore next to caved areas or from pillar blasting. It can be operated a distance of 75 feet from the control station, visibility being the limiting factor.

fill stoping method used in Canada; store fill in old stopes

added to secure desired density. From the collector, diamond drill holes and pipes connect to the stoping areas.

An underhand hydraulic fill stoping method has been in use at two mines in Ontario. It has unusual advantages in mining heavy ground in large stopes. As each successive round is blasted, the fill above, which is supported by long, laminated stringers, is caught by stulls and more laminated stringers placed on the hard floor. The stopes are driven at a slight incline downward so that when the cut is completed and fill is introduced, the back is firmly supported.

A notable "first" in South Africa is the installation of a Blair multi-rope hoist at President Brand No. 3 shaft. Designed and first announced several years ago by Robert Blair, chief mechanical consultant to Anglo-American Corporation, the system has the advantages of friction hoists with fewer of the disadvantages. The principle of the hoist is that of a twin drum hoist with two ropes on each drum as well as to each skip or cage. Thus it is possible to use smaller cables and handle larger payloads from deep levels than with a single drum. At President Brand, a 10-ton payload is hoisted 5,250 feet at 3,000 feet per minute.

Other innovations or trends are increasing full or semi-automatic hoisting using friction hoists, industrial TV at both loading and dumping stations, copper core cables used for communication as well as hoisting, lighter skips using light-weight alloys or aluminum, improved rope lubrication and static-mercury arc converters replacing Ward Leonard MG sets.

One of the most outstanding breakthroughs in development equipment in years—the raise platform—is getting expanded usage and attention throughout the mining world. A Joy-Craig model, manufactured in Canada, is now available as well as the Swedish Alimak. Both are eminently successful in lowering the cost of driving raises as much as $30 per foot or more.

SHAFT DRILLING reached 25-foot diameter in this experimental Texas shaft.

ment is developing rapidly. Hugh B. Williams Manufacturing Company of Dallas, Texas, has contributed greatly to the developing of suitable equipment. From 72 to 90-inch diameter shafts which have been sunk at phenomenal speed, the thinking has jumped ahead to 15 and 25 foot diameters. Two test shafts of these sizes are being drilled near Dallas by the Williams Company.

San Manuel pre-grouts ahead of drifting

San Manuel Copper Corporation in addition to being one of the foremost proponents and practitioners of the use of concrete for ground support in underground mines, has developed new procedures and techniques in the use of grouting to stabilize ground. Significant cost reductions have been achieved in development excavation by pre-grouting loose or broken ground, and in drift repair by grouting fractured rock over the timber or steel drift supports. Grouting crews are equipped with a drill jumbo, air-agitated mixing tank, and grout pump, all track-mounted. Grouting pressures vary from 100 up to as high as 1,000 pounds per square inch by using two Gardner-Denver 6 by 2½ by 6 inch FG-AG pumps in series.

The use of foam in helping to fight mine fires has, by research and experimentation in England, the United States, and Australia, been brought to a stage of development where it can be practically applied. Basically, mine or mechanically induced air currents passing through a fabric mesh stretched across a mine opening and on which a mixture of water and detergent is sprayed produces a mass of bubbles. These soon fill the opening on the downwind side of the net and advance as a plug toward the seat of the fire. The plug will either put out the fire or subdue it sufficiently to allow more conventional fire fighting methods to be put into effect. The technique is not a cure-all and can be used only in certain circumstances, but if used early enough can make the difference between controlling and losing control of a mine fire.

High tensile strength, ⅝ inch expansion shell rock bolts are being widely used in Canada, particularly in hydraulic fill stopes where ground support is a problem of relatively short duration. Having recently become available in the United States, their use should increase rapidly as a cost reduction measure supplanting to some extent the use of the more expensive ¾ inch expansion shell or 1-inch slot-and-wedge bolts.

OPEN PIT SUMMARY ON NEXT PAGE

Seek to cut pit haulage costs by using new,

larger units with Diesel-electric drives

Joy's 965-BH Champion rotary drill is being used successfully by Hanna Coal Company near Cadiz, Ohio. One of the new features is that it can drill angle holes up to 30° off vertical. This new technique in open pit rotary drilling can result in lower cost blasting, better fragmentation, and more stable banks.

Ammonium nitrate and fuel oil has become easily the most predominant explosive used in open pit blasting. The essential nature of the mixture itself, modification of its use under varying conditions, and methods of handling it are now the focus of attention. Considerable research is going on in many pits with regard to sizes of prills, mixtures of prills and granular sizes, nature of coating, and various hydrocarbon additives to obtain maximum effectiveness.

With the big cost reduction resulting from converting to AN/FO from higher priced explosives now under their belts, many companies have successfully explored the economics of handling it in bulk, and mechanical mixing as well as mechanical loading of holes. Storage bins may be loaded by gravity from hopper cars or truck, or by a combination of under-the-track augur and bucket elevator. Delivery to the hole takes several forms. One solution is the use of modified cement trucks where FO is added to the AN charge and thoroughly mixed on the trip to the blast site. The principal disadvantage here is that the hole has to be sounded as it is loaded to determine when the correct amount of charge has been placed. (One truck has a metering device). Other trucks have been developed to transport the AN dry and measure the correct amount into a hopper either pneumatically, by augur, or by gravity.

In this trend toward bulk handling, and mechanical mixing and loading in blast holes, many companies have found it economically advantageous to contract the job as evidenced by the fact that the number of contractors who do this work is significantly large. It is to be expected that this trend also is likely to continue.

Dow Chemical Company's new metallized explosive, available now on contract, is undergoing further testing on the Iron Range. Good fragmentation is secured with 45 foot spacing. Many mining men are awaiting further details concerned with the economics of the new explosive.

Slurried AN containing various combinations of water, TNT, sodium borate, guar gum, urea, sodium nitrate, etc. have been adapted as the standard explosive at many mines on the Mesabi Range as well as iron mines in Canada. Hardness of ground and/or presence of water are the principal factors determining the choice between the higher pressure, more expensive slurries and the low pressure, considerably cheaper AN/FO mixture.

For many pits located near residential areas, it was welcome news when DuPont's LEDC (low energy detonating cord) appeared on the market. Though slightly more expensive than other detonating systems, its use in areas where noise and air vibrations are factors is well justified since the noise generated is appreciably lower than with other systems.

The Swedish-developed Libu three-way dump for front-end loaders is now available on Caterpillar Traxcavators on either tracks or rubber. The bucket has open end design and has no trouble in discharging its load. It is a remarkably versatile piece of equipment and has many advantages compared to a standard front-end loader.

Cost reduction opportunities in most open pits are greater in haulage than in other elements of the operations. Consequently much attention has been devoted to the development of larger haulage units including diesel and diesel-electric trucks. But because they are not always the lowest cost solution to the haulage problem, increasing attention has also been directed toward skip haulage and use of conveyors.

There are three Diesel-electric type trucks presently being operated. Unit Rig and Equipment Company's 60-ton "Lectra Haul" with 700 horsepower Diesel is undergoing test by M. H. Hanna Company on the Mesabi Range. Anaconda's Diesel-electric-trolley truck built by R. G. LeTourneau, after initial trials, has recently undergone modification. The single 335 horsepower Diesel used to generate power for off-trolley operation was replaced by two to provide more power when maneuvering on dumps. F&S Construction Company of Butte has recently put into operation its 60-ton "Electro Truck." It is powered by a 700 horsepower Diesel that generates the power driving four electric motors connected by gearing to the four drive wheels. In this it differs from the two above in that the motors are offset from the wheels.

Gas turbine engines hold great promise and may in time play an important part in open pit haulage. Mining men are awaiting with interest the results of trials being given by INCO to a truck powered by an Allison 225 horsepower regenerative gas turbine engine as well as new developments in the gas turbine field by Ford, Boeing, General Electric, Solar, Westinghouse Electric, and others.

Meanwhile there are several entries in the straight Diesel truck class in the 60 ton range with more coming up. LeTourneau-Westinghouse's "Haulpak" is one of these and is undergoing production testing at a number of pits. Its unique "Hydrair" suspension cushions shock and adds to tire life.

Successful skiphoisting systems have been installed on the Mesabi, at Pima in Arizona, and at the Liberty Pit in Nevada. Recently, Kennecott announced awarding of a $2,350,000 contract to National Iron Company to install 40-ton skips at its Chino Pit in New Mexico. The 30° inclined track will be 1,400 feet long. Capacity is expected to be 1,000 tons per hour.

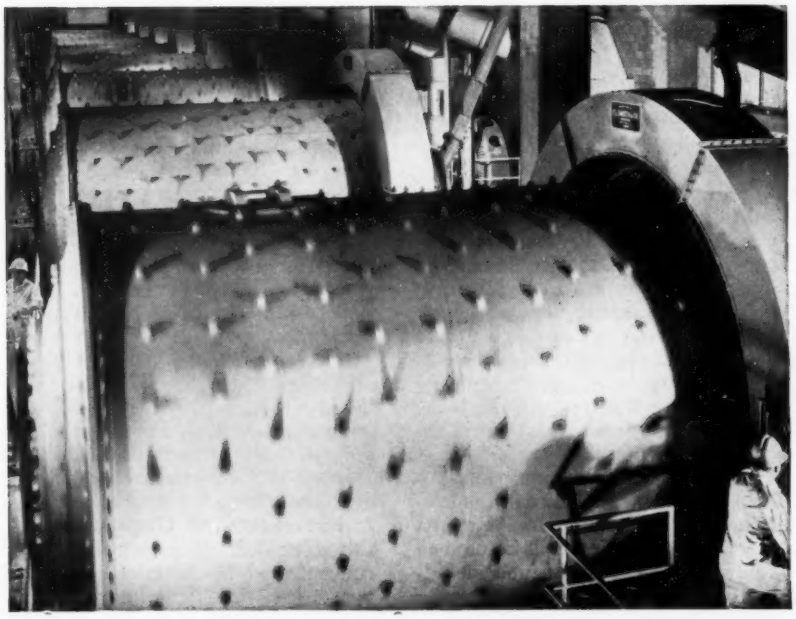
Conveyor belts are being used more in the drive toward low-cost haulage. Under favorable circumstances, they are being found to provide dependable, low-cost, high efficiency materials handling systems. Compared to truck haulage, they are often not only safer, but decrease maintenance headaches, and reduce required manpower.

Another development for conveying up steep inclines is the use of an endless chain mat which is driven at the same speed but independently of the conveyor belt, and is laid over the load to prevent the materials from rolling or slipping. To achieve the same purpose, the so-called "sandwich" belt has been successfully utilized. Here, a second belt is pressed down over the load on a troughed conveyor by means of rubber-tired rollers with adjustable tension. Transport at an incline of 40° is possible.

SMIDTH

rotary kilns

For sintering, nodulizing, calcining, desulphurizing, oxidizing and reducing roasting. Coolers, precoolers, preheaters, recuperators. Auxiliary equipment for Rotary Kiln Plants.



grinding mills

Ball mills, tube mills and multicompartment mills—open or closed circuit—wet or dry grinding. Also airswept for grinding and drying. Over 1250 Smidth Rotary Kilns and over 5000 Grinding Mills supplied all over the world.

F. L. Smidth & Co.
Incorporated
ROCKEFELLER CENTER
1270 Avenue of The Americas
New York 20, N. Y.

F. L. Smidth & Co., A/S
77 Vigerslev Alle
Copenhagen, Denmark

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. of Canada, Ltd.
1270 Avenue of The Americas
New York 20, N. Y.

F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India

IRON ORE BENEFICIATION—magnetizing

Anyone who has a familiarity with the iron ore mining industry in the Lake Superior region knows that the year 1960 brought about some rather profound changes. This was particularly true for underground mining. The reason: underground mines do not produce ores which can compete favorably with foreign imports or domestically upgraded ores in iron content or quality and thus are finding it increasingly difficult to compete with these other sources of raw materials. During 1960, companies producing from underground mines spent considerable time, money and effort in trying to upgrade their ores by improving iron content and physical structure. A major effort was put into reducing mining costs.

Lake Superior underground operators are attempting to attack these problems of their ores in a number of ways. Among the methods being tried are drying and screening to remove the fines. The coarse material can be charged directly to the blast furnaces and the fines can be sintered. Oliver Iron Mining Division announced that it plans to build a washing plant at the Pioneer mine near Ely, Minnesota. The plant will consist of a crusher, screens, a classifier, and spirals.

A new device introduced in 1960 which, it is hoped, will facilitate screening wet, sticky ores is the Anderson Air Rinse. This new unit literally blows the fines through the screen opening. One unit is now being tested at the Penokee mine of the North Range Mining Company on the Gogebic Range.

Agglomeration highlight for 1960 was the startup of the Humboldt Mining Company's new pelletizing plant located near Ishpeming, Michigan. This new operation is rated to produce 650,000 gross tons of high grade pellets per year from a specular hematite—lean iron material—which is concentrated by flotation.

Fine concentrate from the flotation section is conveyed to the agglomerating plant where it is formed into hard durable balls of minus-½-inch size. Bentonite clay is added to the concentrate to act as a binder. Green pellets are formed in a balling drum with heat treatment in the Allis-Chalmers grate kiln process.

Construction of new sintering plants continued at an accelerated pace throughout 1960. It is estimated that there were between 35 and 40 plants newly completed or under construction throughout the Free World.

The largest single strand sinter line in the world began operations at Aliquippa, Pennsylvania. It is operated by Jones and Laughlin Steel Corporation. The plant is capable of producing over 225,000 net tons per month of high quality sinter for blast furnace feed. The hearth is 13 feet 2 inches wide and has an area of 2,419 square feet.

J&L also began operation of a new breaking, cooling, and screening facility at its sintering plants at Benson Mines, New York. The facilities include a vertical shaft stationary cooler—the first of its type in the world. The unit, taking the production of two 6 foot wide sinter machines, has a capacity of 3,800 gross tons per day.

Reserve Mining Company demonstrated that by careful study of operating variables and intelligent evaluating of results, considerable improvement in both economy and quality of pellets could be obtained. It was found that closer control of grinding to maintain a constant percent minus-325-mesh, perfect water control in the feed to the balling drums, close control of the rotational speed of the drums, reduction of vibration of the drums, balancing of the drums so that they spin at a uniform rate, maintenance of the bed drum slopes and a small change in pellet size all contribute to better green pellets.

Magnetic roasting pilot plants were built on the Mesabi Range to experiment with the production of iron ore concentrate from semitaconite and heavy media rejects. M. A. Hanna Company and Oliver Mining Division both studied magnetizing roasting to reduce hematite to magnetite and for utilizing conventional magnetic separation to recover the artificial magnetite. The Hanna plant is operating near Cooley and the Oliver plant near Coleraine, both in Minnesota. Reports are that these plants will be used to study a wide variety of fuels including oil, peat, fine coal, and gas.

At Rolla, Missouri, the U. S. Bureau of Mines has been engaged in laboratory-scale efforts to upgrade certain low-grade iron ores from east Texas. Of the various methods tried the most successful was reported to be roasting followed by magnetic separation. This procedure recovered up to 87 percent of the total iron in one composite of limonite and siderite. A number of other companies are also making comprehensive studies of this process.

Flotation of low grade iron ores was boosted by completion of the expansion of Humboldt Mining Company's Humboldt mill to 650,000 annual gross tons of concentrate assaying over 62 percent iron. The final concentrate is reground in a ball mill from 45 percent minus-325-mesh to 75 percent minus-325-mesh to permit formation of superior pellets. The Humboldt Mine is operated by the Cleveland-Cliffs Iron Company and is owned jointly by Cleveland-Cliffs and the Ford Motor Company.

Cleveland-Cliffs also announced that the capacity of the Republic mine on the Marquette Range near Republic, Michigan, will be increased from 700,000 to 1,600,000 gross tons of iron ore concentrates per year.

Both Humboldt and Republic use fatty acid type reagents for flotation.

M. A. Hanna Company continued operation of its Groveland plant situated at Randville, Michigan, 15 miles north of Iron Mountain. This plant crushes and grinds to minus-28-mesh and concentrates the liberated iron minerals, specular hematite and magnetite, by Humphreys spirals. The tailing is reground and concentrated by flotation. The reagents used in this flotation system are petroleum sulfonate, fuel oil, and fatty acid.

Direction reduction continued to get increasing publicity during 1960. A number of direct reduction plants have operated in Europe and Asia. During 1960, several on the North American continent were either started or expanded.

There are a few processes that are presently in commercial production.

roasting, cheaper grinding, direct reduction

These are the HyL plants which are being operated successfully by Hojalata y Lamina in its plants in Monterrey, Mexico. A 200 ton per day plant was so successful that a 500 ton plant was constructed adjacent to it. This plant started in November, 1960. Plans are being made for Premium Iron Co., Ltd., of Canada to build a plant at Fort Williams, Port Arthur, to process Strip-Rock Lake ore.

Another direct reduction process which is in commercial operation is the H-Iron process. Alan Wood Steel Company has been operating a 500 ton per day plant since April, 1959. A second plant has been built at the Vernon Works of Bethlehem Steel Company in Los Angeles, California. This plant is designed for 110 tons per day.

In early 1961 there were no commercial plants using the Strategic Udy process. However, a number of them are in the construction or planning stage.

Universal Cyclops Steel Company of Bridgeville, Pennsylvania, is financing a new plant at the Strategic Materials Corporation pilot plant at Niagara Falls, Ontario. The plant is composed of a 150 by 11 foot rotary kiln and a 10,000 KVA electric furnace. The plant is due to start in the spring.

The government of Venezuela has also discussed plans to build a SU plant. The kiln will have dimensions of 250 by 11 feet and will operate in conjunction with nine 36,000 KVA electric furnaces.

Stora Kopparbergs Bergslags A/B announced that Hitachi Metal Industries in Japan will build a plant utilizing the Wiberg-Söderförs process. The plant will have an initial capacity of 10,000 tons per year with provisions for expansion. This direct reduction process was developed in 1918 by Professor Martin Wiberg and was first utilized in 1932 at Söderförs, Sweden. Five other plants have been built since with an estimated capacity of 150,000 tons per year of sponge iron.

The Krupp Renn process, a rotary kiln direct reduction operation, has been applied commercially since the 1930's in Europe and Asia. The most recent plant to go into operation is located at Essen, Borbeck, Germany, where six kilns each measuring about 360 by 15 feet have been installed. Four large kilns have also been installed at Salzgitter-Watensledt, Germany, and two others in Spain.

There are no commercial plants in the Western Hemisphere, but South Western Engineering Company, Krupp representative in the United States, has operated a pilot plant at Pioche, Nevada, treating finely disseminated titaniferous iron ores.

It has been reported that the R-N process is ready for commercial operation. This process, developed by the National Lead Company and Republic Steel Corporation, has been thoroughly tested in a pilot plant since 1954. Numerous ores have been tested and some of the product utilized in steel furnaces.

Still in the pilot stage is the Freeman process, which is a variation on the rotary kiln using co-current firing. It is reported that Freeman has plans to build a larger (100 by 10 foot) kiln with more efficient waste heat recovery than the present 33 by 4 foot kiln. At the present time there are no commercial installations.

One of the newer processes which has been under development at the Dwight-Lloyd Research Laboratory of McDowell Company, Cleveland, Ohio, is said to be ready for commercial operation. This is the DLM (Dwight-Lloyd McWane) process. This process is composed of three steps. They are: pelletizing in a "Flying Saucer"; ignition on Dwight-Lloyd traveling grate; and smelting in a submerged arc electric furnace. Original research started at Battelle Memorial Institute, sponsored by the McWane Cast Iron Pipe Co.

The NU-Iron process has been under development by United States Steel Corporation at its pilot operation at South Works in Chicago, Illinois, since 1954. The pilot plant has been reported to be technically successful. The process employs fluidized beds with hydrogen as the reductant. However, it is not thought to be economical at this time. Nevertheless, the company has designed a 2,000 ton per day plant to be built when and if a cheaper method of producing hydrogen is developed.

The ER-L process, developed by Arthur D. Little, Inc., has been successfully tested in a small pilot unit. This development is another fluidized process somewhat similar to the NU-Iron process, but uses Co and H_2.

For beneficiation the SiphonSizer, developed by the Dorr-Oliver Company, continued to show promise as a gravity aid to magnetic separation. The SiphonSizer is a simplified hindered settling classifier. Water for classification is distributed under pressure through jets located at the bottom of the tank. Two part separation is accomplished. The heavier concentrate settles against the rising current of water while the fine wastes are washed upward to the overflow launder.

Dorr-Oliver announced an improved heavy media process. It claims that media loss can be reduced as much as 80 plus percent. Heart of the process is the Dorr-Clone which serves as a separatory vessel and the DSM screen for feed preparation, medium draining, and tramp service.

Autogenous grinding continued to be studied extensively during 1960. Both the Cascade and Aerofall mill were investigated at a number of pilot installations throughout the world and particularly in North America.

Interest is high in the Cascade mill, particularly the Quebec-Cartier Mining Company's installation, employing 12 18-foot diameter mills.

Cleveland-Cliffs announced that it will begin testing a 22 by 7 foot Cascade mill this summer to determine if it will fit into milling plans for the Empire ore body at Ishpeming, Michigan.

Two papers given at the International Mineral Processing Congress in London, England, indicated that, after extensive pilot plant studies, the Aerofall mill has metallurgical advantages as well as lower cost for power and wear as compared to conventional mills.

Intensified international exchange of technological equipment and ideas continued in 1960. New iron ore plant designs are therefore becoming less provincial and more international in philosophy. Developments in adjacent mineral fields and other areas of engineering are being watched closely and being integrated into plant flowsheets where applicable. The boundaries of the field of iron ore preparation are consequently becoming more and more hazy. END

INTERNATIONAL JUDGES pick

NEW YORK

Standing, left to right—**C. DeWitt Smith,** Partner, Borcherdt and Smith, Consulting Engineers, Bedford, Massachusetts

Darwin J. Pope, Assistant to Vice President, Mining Department, American Smelting and Refining Company, New York

Brower Dellinger, Assistant Plant Manager, Titanium Division, National Lead Company, Tahawus, New York

Frank N. Spencer, Jr., Manager, Mining and Exploration Division, Cerro Corporation, New York

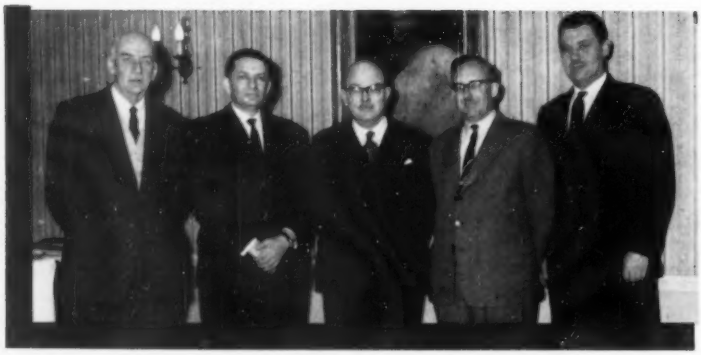
George O. Argall, Jr., Editor, MINING WORLD–WORLD MINING, San Francisco, California

Seated, left to right—**John M. Hoffman,** Mining Manager, The Anaconda Company, New York

John W. Chandler, Manager of Mining Department, Mining and Exploration Division, American Metal Climax, Inc., New York

Rush Spedden, Director of Research, Union Carbide Ore Company, New York

LONDON



Keith Allen, Professor of Mining, Imperial College, Royal School of Mines, London

Paul Klempner, Progress Engineer, National Coal Board, London

F. B. Michell, Vice Principal and Professor of Metallurgy, Camborne School of Mines, Redruth, Cornwall, England

Roy F. Lansdown, Director, Central Engineering Establishment, National Coal Board, Burton-On-Trent, England

Th. Velzebor, Chief Engineer (Horizon Mining), National Coal Board, London

COLOGNE

Professor Dr.-Ing., Dr. phil. Carl-Hellmut Fritzsche, Head of the Mining Engineering and Economics Division, Rheinisch-Westfaelische Technische Hochschule, Aachen, West Germany

Dr.-Ing. Eberhard Goebel, General Manager, Meggen mine, "Sachtleben" A.G. fuer Bergbau und Chemische Industrie, Meggen (Lenne), West Germany

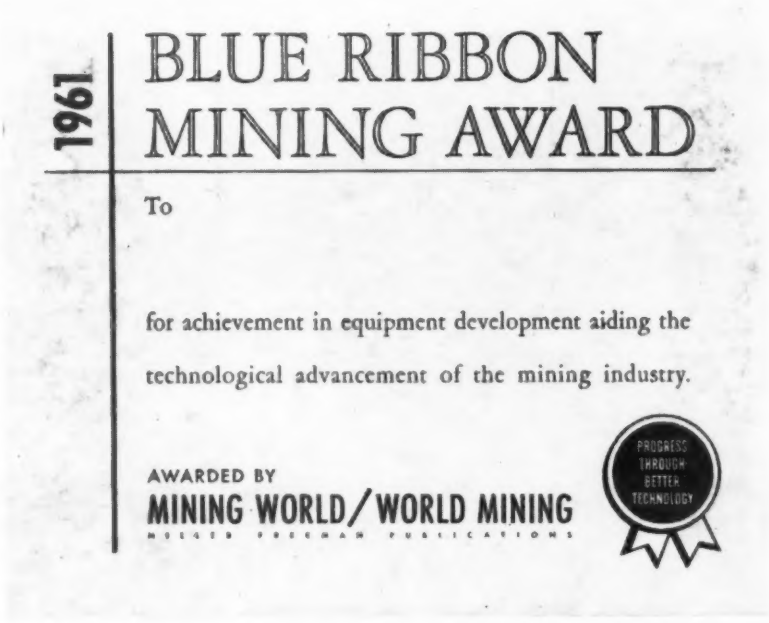
Dr. Ing.- Ernst Albrecht Scheibe, Director, Harz-Lahn-Erzbergbau AG., Bergverwaltung Weilburg/Lahn, Kruppstrasse 1, West Germany

Dr.-Ing. Werner Spross, General Manager, "Bayerland" Bergbaugesellschaft mbH., Pfaffenreuth near Waldsassen, West Germany

the 1961 Blue Ribbon Equipment Awards

New or improved equipment for the minerals industries is eligible to receive one of MINING WORLD-WORLD MINING's Blue Ribbon Equipment Awards. Over the years this annual contest has grown in stature and attracted entries from all over the world. As the interest has grown, with several hundreds of entries from 10 countries this year, it was necessary to expand the judging panel to assure that every entry have the advantage of close scrutiny and accurate evaluation by authorities with world wide experience.

The three country judging panels on the opposite page have made their selections *"for the most outstanding equipment contributions to the advancement of minerals industries technology."*



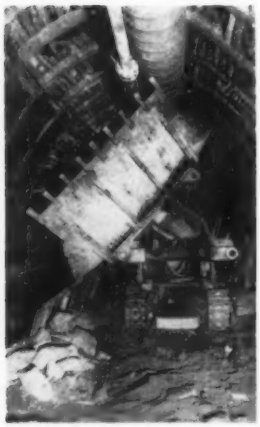
BLUE RIBBON INDEX

Underground awards	58	Open Pit awards	58
Exploration awards	60	Ore Treatment awards	60
Control and Laboratory Service Awards	62	General Equipment and Supplies Awards	62

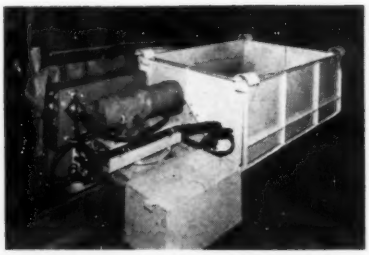
Use the reader inquiry card on page 65 to obtain further information about award winning items

UNDERGROUND

Blue Ribbon

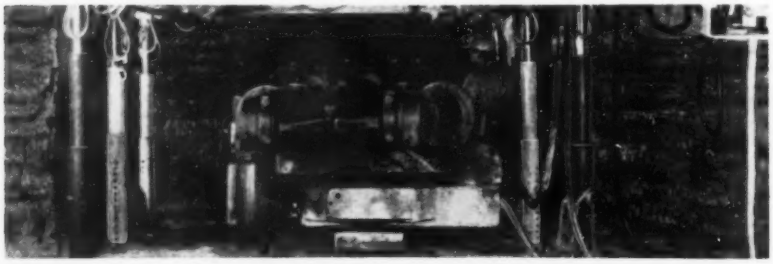


632 LOW HEADROOM loader by Eimco Corp. is only 42 inches high. Bucket holds 18 cubic feet. Easy to convert to dozer. Independent track controls. No. 2.

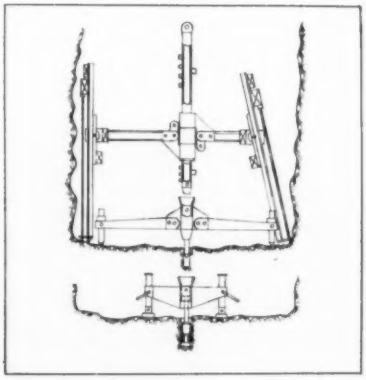


MONOTRAM is battery powered self propelled one-ton haulage unit. Travels, dumps, returns automatically. Climbs 17%. Western Machinery Co. No. 3.

SIDE TIPPING BUCKET loader discharges to chain or belt conveyor near drift face. Mucks and trams 40 to 50 cubic meters per hour from face. Salzgitter Maschinen AG. No. 1.



RODJO SHIELD is a self-advancing hydraulic support designed to protect the operators of continuous mining machines in area ahead of permanent supports. It is steered to follow miner and protects a roof area measuring 14 by 16 feet. Hydraulic jacks support up to 24 tons. Dowty Mining Equipment. No. 7.



MULTIPLE DRILL RIG for large shafts. Mounts 3 to 6 arms for rotary percussion drills. Centered in shaft to assure perfect alignment. TURMAG. No. 8.

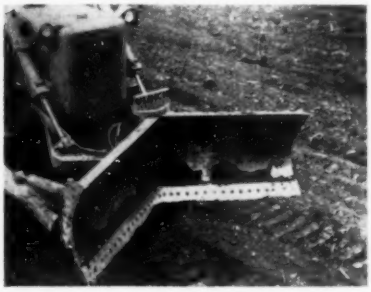
OPEN PIT

Blue Ribbon

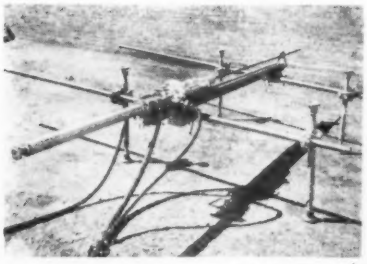
DUAL AUGER coal boring machine mines coal in thin seams to depth of 150 feet from pit bank. Drill and move to next site in only 35 minutes. Salem Tool Co. No. 13.

TDM-B1 trac-drill has automatic traveling hose reel to keep hoses aligned and out of the way to eliminate accidental breaking due to fouling. Joy Mfg. Co. No. 12.

VARIDOZER blade for Caterpillar crawler tractors. Fingertip control gives wide variety of blade positions. Right or left angle, right or left tilt, forward or reverse "V". Blade fits digging conditions. Ulrich Mfg. Co. No. 14.

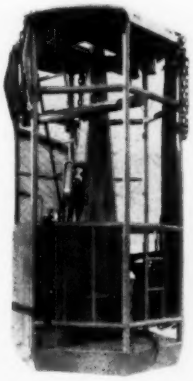


Equipment Awards — UNDERGROUND



THRUSTOR RIG is a guided machine slide to assure high accuracy in spacing and direction of holes to 30 foot depth. Holman Brothers Limited. No. 4.

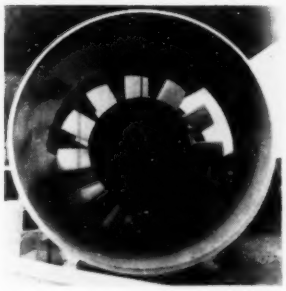
SUBMERSIBLE PUMP built by Gorman-Rupp Co. is electrically driven. Undamaged by running dry. Long life chrome-coated iron wearing parts. No. 5.



JORA RAISE platform built by Boliden Gruv AB has built-in air hoist which is operated by miners to raise or lower. No. 6.

LADDER drilling is fast, low-cost for long holes. Airleg machine with retractable pusher is mounted on ladder bar with steel centralizer. Atlas Copco. No. 9.

ADJUSTABLE blade two-stage ventilation fan is hydraulically controlled to change air volume. Dinglerwerke. No. 10.

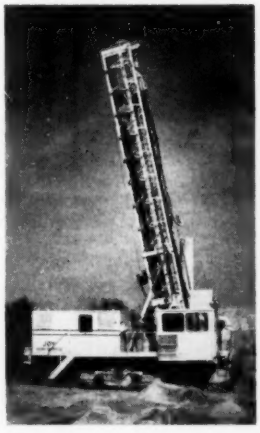


ALIROBOT mounts two drills for low head stoping. Remotely controlled. Bulldozer blade or front end loader can be attached. Alimak Corp. No. 11.

Equipment Awards — OPEN PIT

HAULPAK truck, Model 60, has top speed of 46.6 miles per hour with 60-ton load, almost twice its own weight. Diesel motor is 550 hp. Built with many earth-mover type units for rugged duty. LeTourneau-Westinghouse Co. No. 15.

965BH CHAMPION rotary blast hole drill with derrick which can be tilted as much as 30° off vertical to drill more effective holes. Joy Manufacturing Co. No. 17.

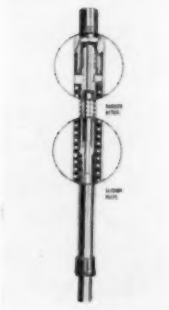


SAF-T-BOOST primer has detonation velocity of 25,200 feet per second for detonation of ammonium nitrate-Diesel oil. Can be burned in air without detonation. Propellex Chem. Div., Chromalloy Corp. No. 16.

EXPLORATION — Blue Ribbon

OKI PERMEAMETER is used to locate boundaries between magnetic ores and gangue in drill holes. Also indicates differences of magnetic permeability of rocks so that changes within magnetic deposits can be recorded. Can be used in diamond or percussion holes. Otanmaki Oy. No. 18.

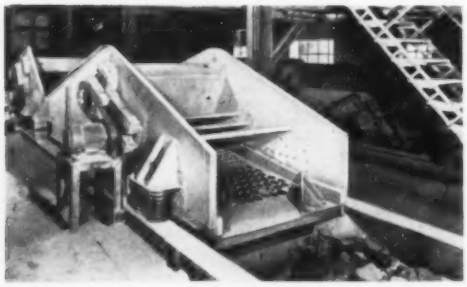
DRILLHOLE MAGNETOMETER is three-component unit for 36 millimeter diameter holes. Measures both direction and magnitude of force. Pushed in hole with aluminum rods. Otanmaki Oy. No. 19.



PITCHER sampler designed to recover accurate samples from clays, soft rocks, and friable shales. Spring seated tube telescopes into outer barrel as cutters core harder formations to eliminate excessive pressure. Mobile Drilling. No. 21.

REPLACEABLE cone rotary rock bit allows individual cones to be changed as needed. Substantial savings in bit costs reported. Varel Mfg. Co. No. 22.

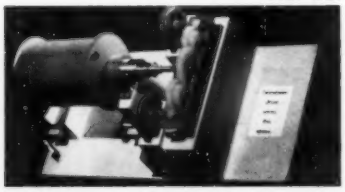
ORE TREATMENT — Blue Ribbon

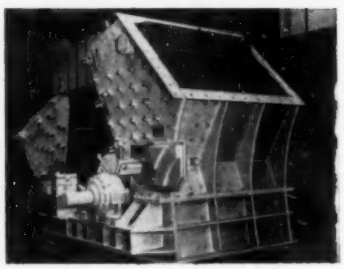


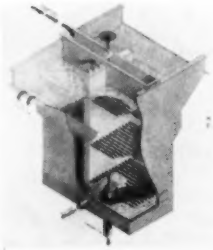
RESONANCE screen with elliptical oscillation path in direction of throw. Load on shaft bearings is as low as 1/10 the inertia forces. Guide springs couple screen to counter-swing mass. Small or steep throw angle units. F. Krupp. No. 25.

NON-CLOGGING impact crusher, Model V 500/S, has single rotor for sticky iron ore. Hydraulic openings of crusher housing for easy access. Striker blades can be changed in 20 minutes. HAZEMAG. No. 30.

TWINDUCER drive for grinding mills cuts space requirements by 50 percent. Minimum gear wear with this drive. Allis-Chalmers Mfg. Co. No. 26.





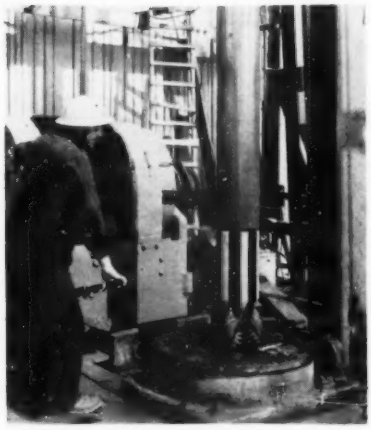


HOLLINGSWORTH flotation cell is designed to minimize formation of slimes during flotation. Reagentized solids are suspended in a stream of water while subjecting them to combined action of finely disseminated air and gentle circulating action induced by cell design. Smith-Douglass Company, Inc. No. 27.

Equipment Awards — EXPLORATION

PROGRESS THROUGH BETTER TECHNOLOGY

ELECTROMAGNETIC detector for helicopter weighs only 250 pounds. The e-m trace is a multiplexed record of "in" and "out" of phase signals. Sensitivity is sufficient to readily detect small conducting bodies at 300 feet. Varian Associates. No. 20.



ELECTRO drill has a built-in 75 horsepower electric motor from 6¾ to 9⅞ inches in diameter mounted in bottom of drill stem to rotate bit at bottom of hole. Drill stem does not rotate. Conductor cable fits inside of drill pipe. Bit revolution rate and torque can be controlled for fastest drilling speed from surface. Hermann Von Rautenkranz. No. 23.

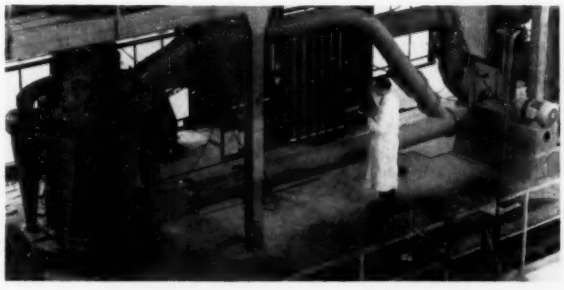
HI-VACUUM rotary drill for holes in all formations at any angle, with or without water. Can drive casing while drilling. Houston Tool Company. No. 24.

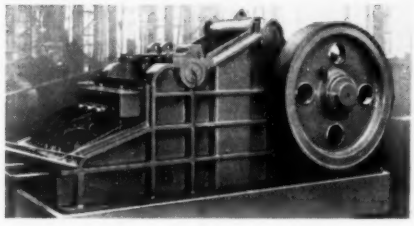
Equipment Awards — ORE TREATMENT

PROGRESS THROUGH BETTER TECHNOLOGY

HYDRAL-60 is a pinch valve control system using one or more Massco-Grigsby pinch valves hydraulically operated with individual controls for manual or solenoid actuation. Used to regulate many pulp and process circuits. Mine and Smelter Supply Co. No. 28.

CYCLONE air separator with a blower fan outside the separator housing. Important advantage for high gas temperatures. Dust-laden air discharges through tangential outlets to cyclones. Thus fine dust is not sucked through main chamber to wear impellers. WEDAG. No. 29.

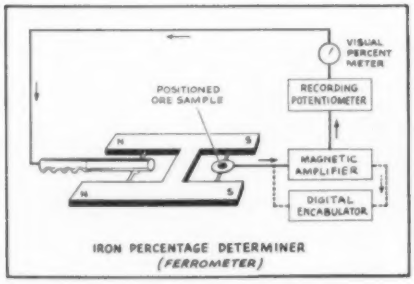




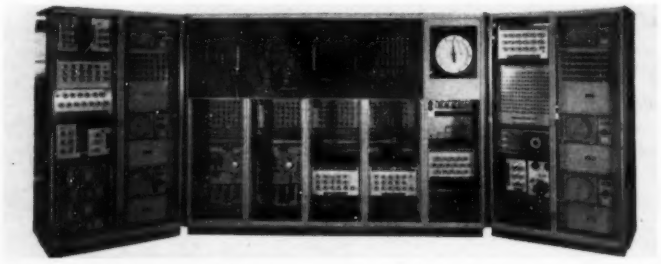
JAW CRUSHER with automatic overload protection. The crusher front wall is pivoted at top. Bottom end is held in place against hydraulic cylinders. Hydraulic system allows bottom end to swing back under uncrushable load so that foreign matter drops down and out to clear crusher for normal operation. Kloeckner-Humboldt-Deutz AG. No. 31.

Blue Ribbon Equipment Awards

CONTROL AND LABORATORY SERVICES



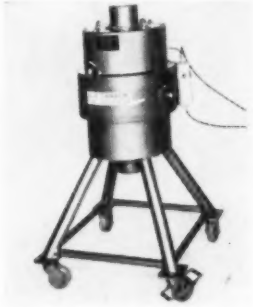
FERROMETER "I" will determine percentages of iron in magnetic ore. Compact metering unit for use by prospectors, mine operators, and in the laboratory. A-W-K Electronics built prototype. No. 32.



AUTOMATION of a 40,000 ton per day crushing, conveying, sampling, and fine ore storage system with blending and proportioning of three types of copper ores. Central panel monitoring and control. Industrial Physics and Electronics Company. No. 33.

SULPHIDE indicating paint turns blue when applied to underground faces with minute mineral sulphides normally invisible. Used for ore waste determination, ore grade etc. M. T. D. (Mangula) Ltd. No. 34.

BERYLLIUM analyzer gives continuous analysis of beryllium bearing pulps. Can detect only a few parts per million. Boulder Scientific Co. No. 35.



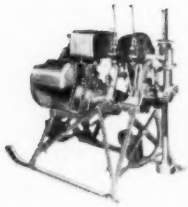
SETICATOR detects and transmits crusher setting to operator during operation. Allis-Chalmers Mfg. Company. No. 36.

GENERAL EQUIPMENT AND SUPPLIES

CALCOVEYOR is a reinforced prestressed concrete conveyor support system. Cast, trucked to job, and erected at lower cost than structural steel. Long life with low maintenance. Frank J. Madison Company has engineering details. No. 37.

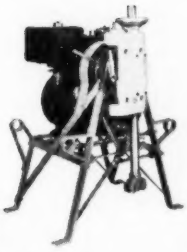
NORDBAK is a tough, resilient, non-metallic backing for manganese crusher parts mixed and poured at room temperature to give consistent and effective support of manganese. Nordberg Mfg. Co. No. 39.

SALA 57 safety block eliminates danger of men falling. Holds 16 feet of steel rope on spring drum. Sudden pull engages lock with no jolt to man. Sala Maskinfabriks AB. No. 38.



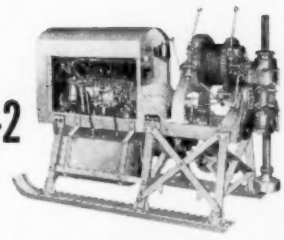
BBS-1

World's best known surface drill. Handles "E" Rods to 1,500 ft., "A" to 1,100 ft.



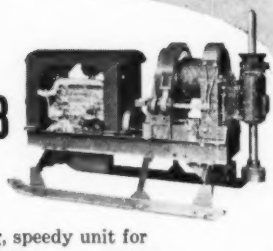
x-ray

Compact, portable—185 lbs. net. Takes $\frac{3}{4}$" or $\frac{7}{8}$" core to 200 ft. Low fuel consumption.



BBS-2

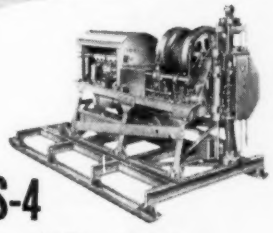
Versatile, choice of 5 swivelheads. Depths to 3,500 ft. Gas or diesel.



BBS-3

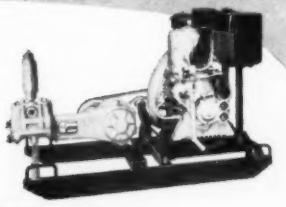
Strong, speedy unit for deep drilling . . . 4,600 ft. with "A" or "B" Rods, 95 h.p. diesel.

if it's for diamond drilling we make it!



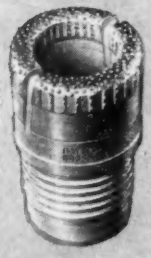
BBS-4

Drills to 5,000 ft. with "B" Rods. Moves under own power, gas or diesel.



drill pumps

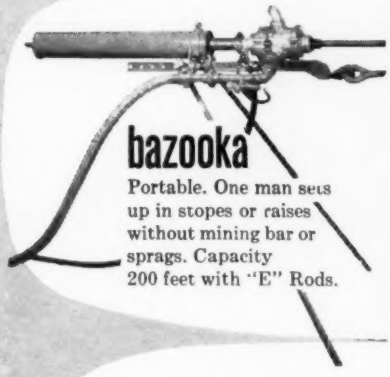
5-12 and 4-7 models. Capacities 400 to 1,200 g.p.h. Diesel motor optional.



permaset bits

(Powdered metal)

All standard sizes available from stock. Also reaming shells, etc.

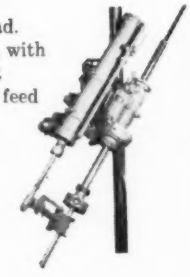


bazooka

Portable. One man sets up in stopes or raises without mining bar or sprags. Capacity 200 feet with "E" Rods.

JV

4 feed swivelhead. Capacity 800 ft. with "E" Rods. JVR with right-hand feed screw for blastholes.



BBU-2

Rugged. Capacity 1,800 ft. with "E" Rods, 1,400 ft. with "A", four gear speeds.

VEG

Vane motored version of J.V. Lightweight, compact construction. Can be speedily dismantled into two units.

58-5

BOYLES BROS
DRILLING COMPANY LTD.
VANCOUVER, CANADA

BOYLES BROS. DRILLING CO. LTD., NEWCASTLE-ON-TYNE, ENGLAND • BOYLES BROS. (PTY.) LTD., JOHANNESBURG, SOUTH AFRICA • BOYLES BROS. (PTY.) LTD., KITWE, NORTHERN RHODESIA • ATLANTIC GULF & PACIFIC COMPANY OF MANILA, MANILA, PHILIPPINES • DR. ALBERTO BIANCHI, MILANO, ITALY • CIA. "DIAMANTINA B.H." S.A., LIMA, PERU • DIMITRY SCALISTIRI, ATHENS, GREECE • FORMAC S.A., RIO DE JANEIRO, BRAZIL • HAEHRE AND COMPANY, A/S, OSLO, NORWAY • ITEC. S.R.L., BUENOS AIRES, ARGENTINA • JOHANSSON & CIA., S.A., LA PAZ, BOLIVIA • SHRIRO TRADING COMPANY S.A., TOKYO, JAPAN • G. WILLIAMS & CO., PRIVATE LTD., BOMBAY, INDIA • WIESE AND CA. LDA., LISBON, PORTUGAL.

ENGINEERED AND BUILT TO YOUR FLOW-SHEET

When we design and build to your flow-sheet, processes are critically analyzed and every step is carefully planned for maximum production at lowest possible cost. Stearns-Roger plants meet your specifications and are designed for future expansion.

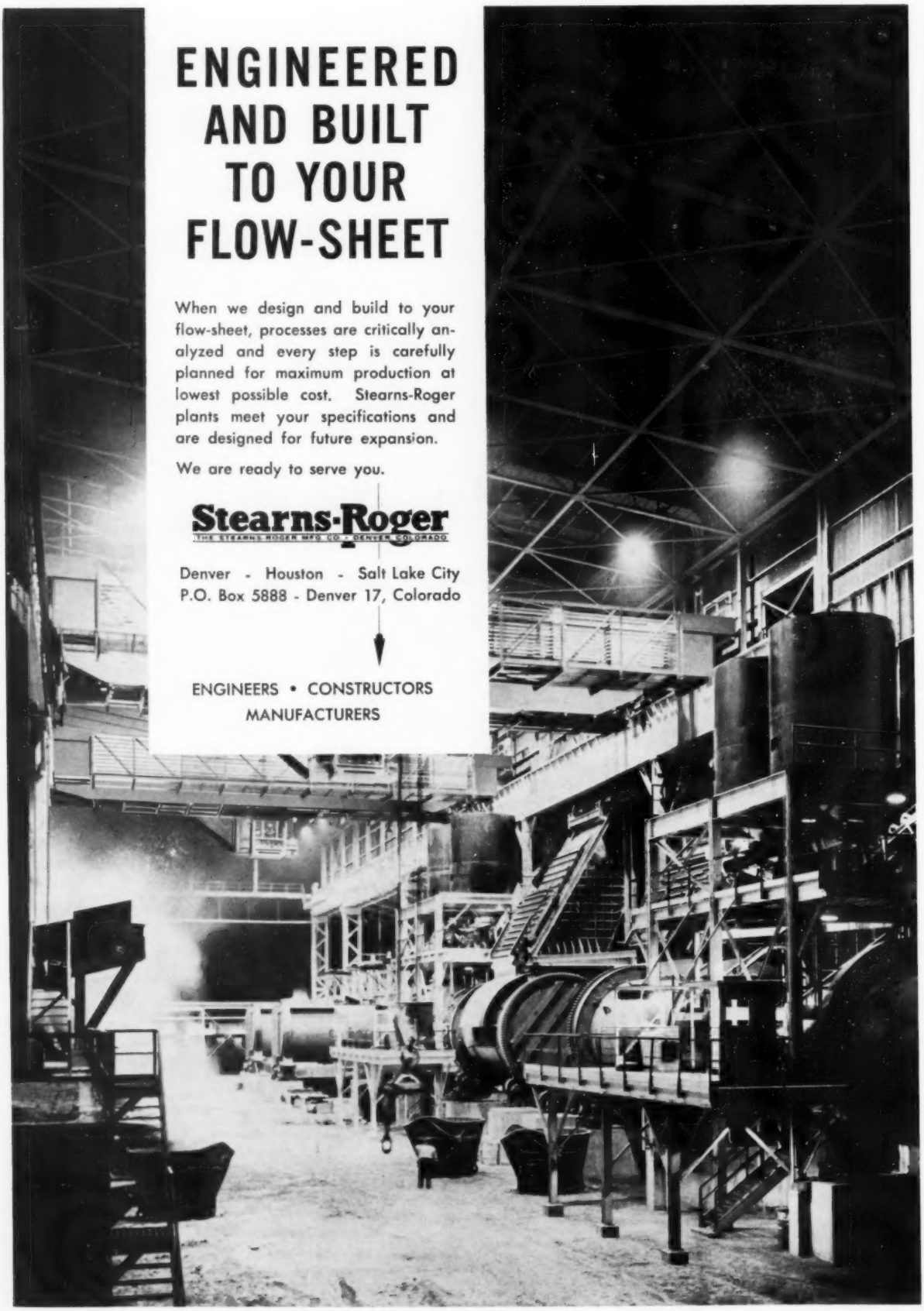
We are ready to serve you.

Stearns-Roger

THE STEARNS-ROGER MFG. CO. • DENVER, COLORADO

Denver - Houston - Salt Lake City
P.O. Box 5888 - Denver 17, Colorado

ENGINEERS • CONSTRUCTORS
MANUFACTURERS



HOW TO USE your pre-filed Catalog Section,

the buyer's guide for mine-mill-smelter equipment

USE THIS CARD TO WRITE TO THE MANUFACTURER DIRECT
Postage required

KEEP the catalog section on your desk for ready reference.

TO FIND the manufacturer of a specific product look under the product heading in Section I of the yellow pages. All principal manufacturers of specialized mine-mill-smelter equipment are listed.

NEXT, refer to the manufacturer's catalog or advertisement for further product description. Advertisers are listed in bold face type.

FOR COMPLETE INFORMATION on any product, fill out the attached postal cards.

THE NAMES AND ADDRESSES of manufacturers are listed alphabetically in Section II of the yellow pages.

FOR COMPLETE INFORMATION on the new equipment previewed in the "Blue Ribbon" section, circle the corresponding number on the reader inquiry card.

List information you want MINING WORLD to obtain for you on this card. WE'LL DO THE REST. No postage necessary if mailed in U. S.

GENTLEMEN:

Please send me FREE information on your equipment as advertised and indexed on page . . . . . in MINING WORLD'S 1961 Annual Catalog, Survey and Directory Number.

Product .....

Product .....

Name ..... Title .....

Company .....

Address .....

MINING WORLD—WORLD MINING CATALOG SERVICE

MINING WORLD—WORLD MINING CATALOG SERVICE

MINING WORLD PRODUCT EDITOR:

Please send me FREE information on the equipment advertised and indexed on:

Page ..... Product ..... Mfr. .....

Page ..... Product ..... Mfr. .....

Page ..... Product ..... Mfr. .....

Page ..... Product ..... Mfr. .....

Page ..... Product ..... Mfr. .....

Name ..... Title .....

Company .....

Address .....

MINING WORLD—WORLD MINING CATALOG SERVICE

MINING WORLD "BLUE RIBBON AWARD" EDITOR:

I wish to obtain further information on the products of the Blue Ribbon award winners as featured on pages 58, 59, 60, 61, 62.

FILL IN NUMBERS OF ITEMS YOU DESIRE

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

Name ..... Title .....
PLEASE PRINT CLEARLY

Company .....

Address .....

USE THESE CARDS to get free up-to-date information on the newest in mine-mill-smelter equipment

Place Stamp Here

To: _____

_____

_____

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY MAIL
FIRST CLASS PERMIT No. 1458, San Francisco, Calif.

MINING WORLD
500 Howard Street
San Francisco 5,
California U.S.A.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY MAIL
FIRST CLASS PERMIT No. 1458, San Francisco, Calif.

MINING WORLD
500 Howard Street
San Francisco 5,
California U.S.A.

READ THE ADVERTISEMENTS. They give you the latest information on mining equipment.

SECTION I of the yellow pages is your product index.

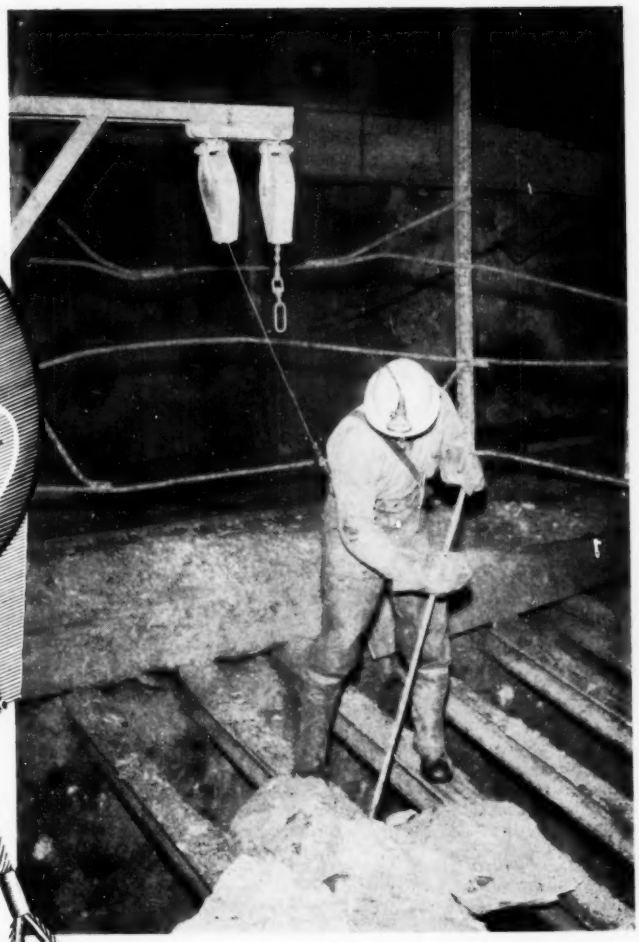
SECTION II of the yellow pages lists alphabetically all principal manufacturers of specialized mining equipment and their addresses.

THE "BLUE RIBBON" Section starting on page 56 will give you the latest equipment developments in the mining industry.

KEEP this catalog section on your desk for ready reference. You will want to refer to it often.

FREE INFORMATION on the newest product developments available for 1961.

List information you want MINING WORLD to obtain for you on this card. WE'LL DO THE REST. NO postage necessary if mailed in U. S.



Sala Safety Block SB-57 Stops a Fall Where It Starts

SALA Safety Block SB-57 has been developed through the co-operation of the Swedish industry and Sala Machine Works in Sweden. It replaces conventional life-lines that frequently required an assistant to keep the line taut during movements of the worker.

The Sala Safety Block SB-57 contains a life-line of Steel Wire Rope, 16 feet long. With normal movement, the rope pulls out and winds up automatically on a spring loaded drum. (Can be locked if desired.) A sudden pull, as caused by a fall, will immediately engage the rope and limit its run to approximately one foot, through a friction brake on the drum. This means that a fall is stopped where it starts, eliminating the risk of injuries caused by a slack life-line.

SOME TYPICAL SALA SAFETY BLOCK SB-57 USES

Mining:	Open Pit Scaling, Ore Passes, Grizzlies, Ore Bins, Material Handling in Cages, etc.
Broadcasting:	Rigging of aerials.
Hydro:	Power lines, Dams.
Aviation:	Working on aircraft wings.
Oil & Gas:	Rigging of towers, Plant Maintenance.

REPRESENTATIVES:

USA
Machinery Center, Inc.
Salt Lake City, Utah

CANADA
Tenace Tools Ltd.
Kirkland Lake, Ontario

CHILE
Gadelius y Cia., Ltda
Santiago de Chile

FRANCE
Etablissements A. Johnson & Cie
Paris 8e

NORWAY
Argo A/S
Oslo

FINLAND
OY Julius Tallberg AB
Helsinki

AUSTRALIA
For scraper hoists:
ASEA Electric (Aust.) Pty. Ltd.
Melbourne

BRAZIL
Cia. T. Janer
Rio de Janeiro

ITALY
Italsvenska S.A.S.
Genova

JAPAN
Gadelius & Co., Ltd.
Tokyo C

SALA MASKINFABRIKS AB

SALA - SWEDEN

ALUMINUM production hits record high but is still 12 percent below capacity

Walter L. Rice
Vice President
Reynolds Metals Company
Richmond, Virginia

Production of domestic primary aluminum in 1960 of a record 2,021,000 tons represented a minor increase over the 1959 output of 1,953,000 tons. Shipments lagged about five percent from the 2,479,000 tons moved in 1959 with the result that year-end stocks at reduction plants increased to a record high of over 200,000 tons. This increase of in-plant inventories arose from an unexpected shift in consumers' policy towards a reduction of the inventories they had accumulated in 1959.

With the low inventories in customers' hands at the outset of 1961, primary producers anticipate an increase in domestic deliveries.

Annual capacity to produce primary aluminum in the United States was augmented from 2,402,750 tons at the beginning of 1960 to 2,468,750 by October 1, 1960. However lessened demand reduced output for the year to about 82 percent of the year-end capacity. Actual production in the last quarter of 1960 was close to 78 percent of available capacity.

Bright spots in aluminum's future are the increases in poundage used in home construction, in the automotive field and by the canning industry. New homes built in 1960 used an average of 170 pounds of aluminum per house. The trend toward lighter automobile engines increased as more producers offered engines with aluminum blocks. A breakthrough in the canning industry promises an increase over the 25,000 tons used by the packing industry in 1960. This tonnage was up substantially from the 17,000-ton consumption in 1959.

Application of aluminum for drill pipe in oil and gas wells, in pipe lines, railroad equipment and in electrical transmission showed significant increases that will continue to grow as important uses of this versatile light metal. One outstanding application of aluminum was in the record-breaking, extra-high voltage line placed in service in December, 1960 near Pittsfield, Massachusetts. This experimental 750,000-volt line makes extensive use of aluminum in cable, towers and substations.

Aluminum projects were in the forefront around the world in new undertakings for expanding output. New units placed in production or planned include the following:

UNITED STATES: Reynolds metals activated the second of three 33,000-ton-per-year potlines at Massena, New York. Alcoa started a new 20,000-ton-per-year potline at Point Comfort, Texas, and the first of five 35,000-ton-per-year potlines at Evansville, Indiana. Plans for new facilities were announced by Harvey to expand output of its reduction plant at The Dalles, Oregon, from 60,000 to 75,000 tons per year. Bonneville power options held by Harvey would provide power for a second 75,000-ton plant. The Cerro Corporation announced plans to construct a 40,000-ton-per-year plant near Longview, Washington, as a result of acquisition of United Pacific Aluminum Corporation.

CANADA: Aluminium, Ltd. construction of a 4,000–5,000-ton-per-year direct reduction plant in Quebec uses an already piloted process that eliminates the alumina production step of existing aluminum processes.

MEXICO: Plans for an aluminum reduction plant to produce 20,000 metric tons per year are still under consideration.

ARGENTINA: Pechiney announced negotiations with the Argentine Government regarding the establishment of a 25,000-ton reduction plant. Kaiser is also participating.

BRAZIL: Aluminio Minas Gerais, S. A. plans a 19,000-short-ton reduction plant and the Companhia Brasileira de Aluminio plans a 22,000-short-ton plant. Additional smelters with a combined capacity of 99,000 short tons are under consideration.

BRITISH GUIANA: Alcan's alumina plant with a capacity of 240,000 tons nears completion.

JAMAICA: Aluminum Company of America plans facility to produce bauxite from a 30,000-acre concession beginning in 1963.

SURINAM: Construction proceeds on Alcoa's Brokopondo project involving a 150,000-kilowatt hydroelectric plant and a 60,000-ton-per-year reduction plant.

VENEZUELA: Reynolds Metals Company, via its subsidiary Reynolds International, and in cooperation with the Venezuelan Government, will build a 25,000-ton-per-year reduction plant.

ANGOLA: A 55,000-short-ton-per-year unit is scheduled by Pechiney.

CAMEROONS: A new smelter with a 55,000-short-ton-capacity is planned by Pechiney.

GHANA: Volta Aluminum Company, Ltd. continues plans for a 180,000-ton-per-year reduction plant.

GUINEA: Fria initiated production of alumina at 550 tons per day from a plant with a designed capacity of 480,000 tons per year. The Boké consortium continued its development of plans for financing its bauxite and alumina project. The Konkoure power and reduction plant project was the subject of active consideration.

FRANCE: Pechiney and Ugine scheduled construction of facilities to pilot an aluminum production process that bypasses the alumina production state. Pechiney expanded its Norguères plant by three pot lines to up output by 84,000 metric tons. Ugine expanded its Lannemezan facilities by 24,000 metric tons. Les Clavaux shut down its 3,500-metric-ton unit. Total French capacity will be 305,000 short tons.

GERMANY: V.A.W. plans 60,000 metric tons of new capacity based on power produced from brown coal.

ITALY: Montecatini has announced a new reduction plant with a 55,000-short-ton output. Improvements in existing plants are expected to increase output from 83,000 tons to 92,000 tons.

SWITZERLAND: Steg may expand by 20,000 metric tons up to total capacity of 58,000 short tons.

NORWAY: Completion of Ardal III and expansion of Mosjöen upped Norwegian capacity to 264,000 short tons. Additional expansions are under consideration of Ardal IV by 10,000 metric tons, Sunndal III by 30,000–40,000 metric tons, Mosjöen by 50,000 metric tons and Norsk Hydro by 50,000 metric tons.

GREECE: A reduction works to produce 50,000 tons per year plus related alumina plant is being planned by a group composed of Pechiney, Ugine, Stavros Niarchos and Reynolds International.

SPAIN: Endasa will add a third line to raise total output to 27,000 metric tons and Aluminio Español will activate a part of its Coruna plant to produce an estimated 7,000 metric tons.

YUGOSLAVIA: Production of the Kidriceuo reduction plant is being increased to 30,000 tons per year and may be further expanded to 55,000 short tons.
AUSTRALIA: Consolidated Zinc Company and Kaiser Aluminum Company have joined in a project involving takeover of the Bell Bay alumina and reduction plant in Tasmania and increasing its 12,000 long-ton-per-year capacity to 28,000 tons. They have also announced a plan to develop the Weipa deposits on Cape York to produce 360,000 long tons per year of alumina. Western Australian Bauxite initiated trial shipments of bauxite to Japan.
NEW ZEALAND: Consolidated Zinc Company and Kaiser Aluminum plan a 280,000-kilowatt power plant and a 120,000-long-ton-per-year reduction plant.
INDIA: Alcoa in collaboration with Tendulkan Industries plans a 22,000-short-ton-per-year reduction plant. Hindustan Aluminium Corporation, Ltd., partially owned by Kaiser, plans a 22,000-short-ton-per-year reduction works to go into production in 1962. Indian Aluminium Company, Ltd., an affiliate of Aluminium Ltd., plans to increase its reduction plant to produce 29,000 short tons per year. Aluminium Corporation of India, Ltd., is expanding its reduction plant to produce 8,000 short tons per year. An Indian company, d'Ahmedabad, with Japanese affiliations, is considering a 33,000-ton smelter for the State of Gujarat. The Bharat Company is considering a 22,000-short-ton unit near Mysore. Salem Madras plans an 11,000-short-ton unit for production by 1965.
JAPAN: Total capacity of NKK, Showa Denko and Sumitomo in 1961 is expected to be 172,000 short tons. Mitsubishi plans a 55,000-short-ton plant and Sumitomo a 66,000-short-ton installation. NKK may increase output by 24,000 short tons. The Nissho Steel group is negotiating with Kaiser.
TAIWAN: Expansion from 8,000 to 22,000 short tons annually is scheduled.

These world developments portend substantial growth for the aluminum industry and imposition of new demands upon bauxite reserves. In 1960 United States bauxite production was close to 2,000,000 long dry tons, 20 percent more than the 1959 output. Imports were estimated at 8,500,000 long dry tons, five percent more than in 1959. Almost 50 percent of the imports came from Jamaica and 35 percent from Surinam with the bulk of the remaining 15 percent supplied from British Guiana, Haiti and the Dominican Republic.

World wide bauxite and aluminum production attained record levels in 1960. Estimates of 23,600,000 long dry tons of bauxite and 4,800,000 short tons of aluminum have been made based on data for the first three quarters.

Secondary aluminum revealed some declines based on incomplete data. Scrap consumption was down eight percent from 1959 to 440,000 tons, with new scrap accounting for 80 percent of the estimated metal recovery of 360,000 tons. Imports of scrap to the United States were off 50 percent to about 5,500 tons but exports of scrap increased 2.5 times over 1959 figures to attain 80,000 tons.

ASBESTOS production makes record in Canada as Russia seeks lead in output

Karl V. Lindell
President
and General Manager
Canadian Johns-Manville
Co., Limited
Asbestos, Quebec

Based on official figures for shipments from Canadian asbestos mines for the year 1960 it appears that world demand and consumption continued to expand. Reported Canadian shipment tonnages for 1960: 1,119,240 tons as compared with 1,050,703 tons in 1959. Despite a drop of some six percent in tonnages shipped to United States and Canadian consumers, total shipments from Canadian mines show an increase over 1959 of six percent. Overseas shipments were higher by about 100,000 tons, or 28 percent, with substantially increased tonnages shipped to all continental areas.

Asbestos crudes and spinning fiber usage held at about the same level as in 1959 with some resultant inventory build-up at the mines. Asbestos shorts and sand (Groups VII and VIII) showed a drop of some 20,000 tons or five percent. Groups IV, V, and VI fibers, used chiefly in asbestos cement products, paper, building materials, etc., were in great demand throughout the year, and tonnages shipped were 16 percent higher than in the previous year.

Canadian asbestos mines generally operated somewhat below capacity in 1960. In some instances, there were partial shutdowns and/or shortened weeks were worked through the early months of the year prior to the opening of navigation. Most mines however were working at capacity in the latter months of the year.

In general, the mines were under continuing pressure from the consumers for improvements in quality of fibers and technical services. This condition was especially prevalent in the "shorts" classifications, and both in the domestic and overseas markets business was extremely competitive. Recent openings of new mines and greatly increased milling capacities at others resulted in a substantial excess of short fiber productive capacity over demand. Research efforts of the major producers are being directed towards finding new uses for asbestos, especially short fibers for use in plastics, use as fillers, etc. A very promising field under active investigation over the past few years involves the addition of small percentages of asbestos in asphaltic paving mixes. Indicated benefits from this development point towards a potential annual usage of up to 500,000 tons of "shorts" in the North American market alone. Continuing demand, particularly from overseas consumers, for more true value per unit of laid-down cost has resulted in the development and wide-spread acceptance of the "Asbestos Fiber Strength Unit Test" for formulation and for comparative evaluation of asbestos cement fibers. As a result of industry generally becoming increasingly "quality" and "cost conscious" the year 1960 in the asbestos industry may be considered highlighted by intensive effort on the part of all miners to improve quality, and at the same time operate with increased efficiency in order to hold down their selling prices.

Through the offices of the Quebec Asbestos Mining Association exchange visits of small delegations of asbestos mining operators were arranged between Canada and the USSR, in mid-1960. The Canadian delegates were impressed by the size and cleanliness of Russian mills, the degree of automation and instrumentation evident in their newest mill, and by the quality of fibers produced. A very large new mill is presently planned which will virtually double present capacity to over 2,000,000 tons of Russian asbestos by 1965.

In 1960, major fields of asbestos exploration and development included: 1. Advocate Mines Limited in Newfoundland where Canadian Johns-Manville Co., Ltd. and associated companies have announced their decision to prepare the property for production by 1963; 2. Acquisition by Cassiar Asbestos Corporation Ltd. of a property near Dawson, Yukon, where 5,000,000 tons of high grade ore have been developed; 3. Extensive exploration by Murray Mining Corporation Ltd. of deposits in the Ungava area of Northern Quebec; 4. Announcement of the formation of Coalinga Asbestos Co. Inc., with Johns-Manville Corporation owning majority interest, for the development of a high grade short fiber deposit in central California. Prospecting, preliminary exploration, and development operations were carried on in many other widely scattered areas.

There are encouraging indications that 1961 will see a continuing modest expansion of world-wide usage of asbestos. The North American economy generally is expected to improve in the latter months of the year with consequent increases in demand for all grades of fiber. In the overseas markets, it appears that Asian countries, particularly Japan, will probably show the greatest increase percentagewise, and will probably be closely followed by South America. In continental Europe, we will probably see the greatest overall tonnage increase. Overriding the whole picture, however, is the continuing drive for quality and service improvements—a healthy competitive situation.

BERYLLIUM grows as space metal; find minerals by new exploration methods

D. H. Hershberger
Treasurer
Brush Beryllium Company
Cleveland, Ohio

The beryllium industry grew substantially during the year 1960 due to the increased use of beryllium metal. Plant and equipment were expanded by $9,000,000 to an investment of $30,000,000 with additional expansion under way at the end of the year. These figures do not include the investments of several companies which fabricate beryllium parts.

All of the ore supplying the industry during the year was beryl and an estimated 9,500 tons of it were consumed in 1960 compared with 8,178 in 1959. A total of 8,943 short tons of beryl was imported from 12 different countries and the remainder came from industrial inventories which are quite substantial.

Beryl producing activity, in some of the countries, has increased somewhat because the market price for beryl has remained steady. Consideration was also given to the possible production of beryl concentrates using existing mining dumps as sources of feed material.

The important uses of beryllium, in terms of dollar volume, were in missile, nuclear, instrument, and space applications. A variety of other uses is under test. Because of its unique nuclear qualities, beryllium is currently being supplied for moderator matrices and reflector sections. In addition, it is being investigated for use in fuel elements, as fuel element cladding, coolant flow liners, and other similar applications. Its light weight and high strength, combined with excellent nuclear properties, make beryllium a leading material for portable and airborne nuclear reactors as well as certain advanced power reactors, particularly the gas-cooled systems.

The structural uses of beryllium in aircraft are now in the development and testing stages. A recent review indicated that beryllium is economically advantageous because of the increased range or payload of lighter weight aircraft.

During 1960 the uses of beryllium oxide also increased substantially. This material has excellent refractory properties but is unique in that it is also an excellent conductor of heat. In view of the unique combination of properties of the metal beryllium, of beryllium oxide, of its alloys, and of the intermetallic compounds, it still appears that the ultimate growth of the beryllium industry could be limited by the availability of ore. Accordingly, an extensive search has been going on to find large workable deposits of beryllium minerals in the United States.

Deposits of beryllium bearing minerals other than beryl are now known to exist in Utah, Colorado, Nevada, Arizona, Alaska, Labrador, and Mexico. The interest in these minerals is based upon the fact that such deposits contain a greater total quantity of beryllium and of a higher average grade than the normal pegmatites which are widely scattered.

Concentrates from these extensive bodies of low-grade ore have not yet been made commercially available. Laboratory and pilot plant developments are most encouraging but more time is required to refine indicated techniques. In addition to the efforts to develop a suitable beryllium mineral concentrate, investigations are under way to develop extraction processes which would be suitable for this new type of ore. Present results indicate that the beryllium content in such ores is directly extractable with acids in contrast to beryl.

Pilot plant flotation work was carried on by at least three groups aside from the U. S. Bureau of Mines. It is hoped that at some time in 1962 shipments of United States concentrates might be made to supplement industry's imported supplies.

United States Receipts of Beryl in Short Tons By Countries of Origin for 1955 Through 1960

Country of Origin	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*
Argentina	441	2,330	1,545	772	2,480	1,212
Belgian Congo	128	992	222	1,188	395	534
Brazil	1,735	2,607	2,165	888	2,833	3,493
British East Africa	84	264	56	30	15	260
British Somaliland	9	29	0	0	0	0
British West Africa	0	22	0	0	0	9
Morocco	0	26	0	0	0	0
French Somaliland	0	0	0	0	0	11
Hong Kong	0	1	0	0	0	0
India	845	3,360	1,256	600	0	1,000
Madagascar	28	212	43	0	329	140
Mozambique	620	1,110	965	284	1,382	1,694
Norway	0	0	0	3	4	0
Pakistan	0	15	69	0	0	0
Portugal	283	242	33	0	77	27
Rhodesia & Nyasaland	861	559	266	135	151	236
Sweden	0	0	0	0	41	0
Union of South Africa	994	602	670	699	331	327
Total Imports	6,028	12,371	7,290	4,599	8,038	8,943
United States of America	500	460	521	463	350	210
Total Supply	6,528	12,831	7,811	5,062	8,388	9,153

BORON finds growing uses in chemical compounds with less interest in fuel uses

Boron production maintained its high level in the United States, there was a growing trend for United States companies to form new companies with foreign associates to make and sell boron-based chemicals abroad, there was a continued high level of research activity on boron chemicals, and limited exploration was done to account for highlights of the industry during 1960.

United States Borax Company continued as the largest world producer from its pit at Boron, California, where a new belt conveyor was installed to cut mining costs. American Potash and Chemical Corporation started plant construction at its Searles Lake, California plant to increase output 35 percent by mid-1961. Most of this tonnage will come from a new circuit independent of its existing plant facilities. Part will also come from its new evaporator plant. Stauffer Chemical Company, the third United States producer (California) reported no plant additions during the year.

United States Borax's parent company—Borax Holdings, Ltd.—increased boric acid plant facilities in France and England. American Potash joined the French firm UGINE to form a new company to build a boric acid plant in southern France, using ore imported from Turkey. Stauffer produced boron compounds in Germany through its international subsidiary company.

Research, largely sponsored and financed by the three major producers and also by government and independent laboratories, was at a high level during the year. High energy borane fuels, boron phosphorus compounds (borophanes), titanium diboride, and boron plastic compounds constituted the major part of research activity.

Titanium diboride and its alloys attracted great interest as possible cathodes for use in aluminum electrolysis.

Exploration drilling was carried out in Nevada and California by several small mining companies. Argentina and Turkey were the scene of foreign exploration.

With more than $4,000,000 spent on boron research in the United States in 1960, the outlook is for new compounds and new uses so that the boron industry will continue to grow as it creates new markets as well as supplying the old—soaps, glass, fiberglass, ceramics, fire fighting agents, and a wide variety of chemicals.

COBALT consumption in United States leveled off but Free World demand increased

F. R. Morral
Cobalt Information Center
Battelle Memorial Institute
Columbus, Ohio

Preliminary world cobalt production statistics for 1960, as reported by the Cobalt Development Institute, are given and compared with those of previous years. Only a 4.0 percent reduction in world production (700 short tons) took place, while United States consumption is estimated at a minimum of 400 short tons less than for 1959. (See Table No. II).

Table No. I

Cobalt Production by Countries in Short Tons of Contained Cobalt

Country	*1957*	*1958*	*1959*	*1960*
Katanga (Congo Republic)	9,029	7,179	9,294	9,083
Northern Rhodesia	1,566	1,677	2,372	1,929
Germany	1,082	1,219	1,620	1,640
Canada	2,253	1,610	1,505[1]	1,729
Morocco	466	1,021	1,391	1,475
United States	1,649	2,009	1,250	885[2]
Others	55	35	68[1]	59[2]
Total	16,100	14,750	17,500	16,800

[1] Revised. [2] Estimated.

Table No. II

United States Cobalt Consumption Percent by Uses and Total in Tons

	1960	*1959*	*1958*	*1957*
Permanent magnets	26.7%	30.0%	31.0%	32.0%
Superalloys	22.5	24.4	29.1	30.0
Steels	8.7	8.4	2.5	3.8
Cutting, wear, and hard facing	11.7	8.9	8.9	11.1
Other metallic uses	6.9	6.6	3.3	2.6
Salts, etc.	23.5	21.5	25.2	20.5
Totals in tons	4,152[1]	4,949	3,771	4,578

[1] First 11 months of 1960 only.

North America's important contribution to world cobalt production failed to materialize in 1960 because of the loss of the expected Cuban concentrates from Freeport Nickel Company. The Deloro Smelting and Refining Company of Canada has announced it will close its cobalt production plant in 1961. Sherritt-Gordon Mines Ltd., however, is developing a special circuit to process the Canadian silver-cobalt ores previously smelted at Deloro.

Disturbances in the Congo Republic (previously Belgian Congo) caused some misgivings about the cobalt supply for United States consumers. However, production in Katanga was near normal in 1960 (see Table I); the political events had practically no effect on Union Minière du Haut Katanga's operations. In fact, Union Minière's new electrolytic plant at Luilu is due to start operation the latter half of 1961.

The amount of cobalt imported into the United States between January and November, 1960, was greater than that consumed in any single year (5,760 short tons). A recent *Mineral Market* report of the U.S. Bureau of Mines indicated that United States stock (in addition to the standing stockpile) totaled 13,500 short tons, or about three times the average annual consumption for the past three years.

Although Table No. II shows consumption figures for only the first 11 months of 1960, it is anticipated that the total consumption for the year will be similar to that for 1957, or about 10 percent less than for 1959. Use of cobalt in permanent magnets and superalloys in 1960 appears to have decreased 10 percent from that in 1959, while cobalt in steels, as in 1959, will be more than double what it was in previous years. The consumption of cobalt in cutting, wear-resistant and hard-facing alloys (including cemented carbides) in 1960 is greater than in previous years. The consumption of cobalt in chemical compounds, salts, driers, pigments, etc., is estimated at the same tonnage in 1960 as in 1959. This was higher than for previous years.

While United States cobalt consumption has leveled off, there has been a sharp increase in consumption in the rest of the Free World. Total Free World cobalt sales to industry, which between 1956 and 1958 were estimated at 9,500 short tons, rose to 12,000 short tons in 1959. In 1960, they are believed to have passed 14,000 short tons. This increase may have been somewhat affected by the reduction in the price of cobalt to $1.50 per pound, effective March 1, 1960.

Highlights in cobalt during the past year were:

1. SM-302 has been announced as a cobalt-base jet-engine alloy. Data on the WI-52 alloy have been compiled and presented by the Defense Metals Information Center. Haynes alloy No. 56 (10–13% Co) has been made commercially available. Test data on this alloy indicate high resistance to oxidation to 1,900° F. with high strength. Rocoloy, a 1 percent cobalt, silicon-modified 4137 AISI steel, has been announced for the missile industry. This material has a yield strength of 270 ksi.

2. Co-Cr alloy wires have been reported suitable for the manufacturer of high-temperature fabrics used in re-entry parachutes.

3. The U. S. Bureau of Mines researchers studied the effect of cobalt on some titanium alloys and found a considerable improvement.

4. There was renewed interest in Supermendur (Fe-Co-V) because of magnetic properties which permit important size and weight reduction as transformer material for airborne electronic equipment. Alnico V-7, with a maximum energy product of 7×10^6 gauss-oersted, permits miniaturization of aerospace equipment.

5. Havar (42.5% Co, 20 Cr, 13 Ni), cold rolled to 0.00025-inch thickness, is used as a protective film over Univac tape heads.

6. Cobalt powders have been pressed, sintered, and fabricated into sheet and also porous sheet which may be used for filters. High-strength, porous cobalt-nickel strips capable of filtering liquids have been made.

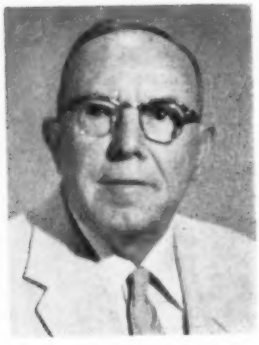
7. A diffusion-coating process which imparts an oxidation-resistant surface layer has been announced for cobalt-, nickel-, and iron-base alloys. The coated parts withstand 2,000° F. for 500 hours with no weight loss.

Resistance to high temperature has been of considerable concern for uses such as springs and bearings. Continuous operation at 1400° F. has been obtained with HS-25 springs. Cobalt-base alloy sleeves and bushings were selected for high-temperature, difficult-to-lubricate applications.

Among recent publications, the U. S. Bureau of Mines has prepared a new chapter on cobalt for its *Mineral Facts and Problems*, 1960 edition; the American Chemical Society Monograph No. 149 on cobalt has been edited by Dr. R. S. Young; and the Centre d'Information du Cobalt published its *Cobalt Monograph* in 1960. From these three new publications, however, it is evident that there is still inadequate knowledge of the properties of cobalt and its functions—this is deterrent toward exploiting cobalt's usefulness.

The Centre d'Information du Cobalt, Brussels, Belgium, is sponsoring fundamental research in 1961 in the following areas: effect of cobalt on diffusion and structural phenomena; equilibrium diagrams of cobalt binary and ternary systems; precipitation of intermetallic compounds in cobalt-base alloys; study of magnetism in nonmetallic structures containing cobalt ions; and galling properties of cobalt alloys. Applied research is being done on the effect of cobalt in steels; properties and applications of UMCo-50 (high-temperature, wear-resistant alloy); cobalt-containing permanent magnets; heat-resistant Co-Cr alloys produced by powder metallurgy; nickel-cobalt coatings; and catalysts for the complete combustion of fuels. Progress on these research projects will be reported in the Centre's quarterly publication, *Cobalt*.

COPPER demand increases; new discoveries and mine-mill expansion continue



Frank J. Tuck
Statistical Engineer
Arizona Department
of Mineral Resources
Phoenix, Arizona

A preliminary estimate of recoverable copper production from United States mines in 1960 was up over 30 percent from the final figures of the 1959 production. The U. S. Bureau of Mines estimated the 1960 production to be 1,082,650 while the Copper Institute's estimate was 1,138,265 tons. The actual production will probably fall between those two figures.

Based on an estimated annual capacity of 1,300,000 tons of recoverable copper, the actual mine production was about 67.5 percent of capacity during the first quarter, and about 88 percent during the last three quarters of the year. Production in the first quarter was affected by the strike at a few plants extending over into the first two months of the year.

Free World production outside the United States is estimated to have been 2,650,000 tons in 1960, as compared with 2,623,000 tons in 1959. Copper production in Communist-controlled countries is not known but it is believed to have been at least 600,000 tons in 1960, as compared with 572,000 tons in 1959. The total world mine production is therefore estimated at 4,350,000 tons in 1960, as compared with 4,020,000 tons in 1959.

The Free World mine production, outside the United States, of 2,650,000 tons amounted to about 87 percent of Free World capacity of 3,050,000 tons.

United States refined copper production in 1960 was reported by the Bureau of Mines at 1,118,000 tons of domestic copper and 396,000 tons of foreign; total 1,514,000 tons. This includes an estimated 304,000 tons of secondary unalloyed copper. The Copper Institute reported a total refined production of 1,675,390 tons, which includes 1,138,265 tons of United States mine production, 141,300 tons of secondary, and 395,825 tons of foreign copper.

According to the U. S. Bureau of Mines, United States imports of copper in 1960 amounted to 80,536 tons in ore, matte and regulus, 296,160 tons of blister, and 142,706 tons of refined, total 519,402 tons; as compared with 82,523 tons in ore, matte and regulus, 287,665 tons of blister, and 214,056 tons of refined, in 1959, total 584,244. Copper exports in 1960 amounted to 11,111 tons of copper in ore, concentrates, and matte, and 433,762 tons of refined ingots, bars etc., total 444,873 tons; as compared with 2,981 tons of copper in ore, concentrates and matte, and 159,702 tons of refined ingots, bars etc., in 1959. The net excess of imports over exports in 1960 was 74,529 tons, as compared with 421,561 tons in 1959.

Apparent consumption of new refined copper in the United States in 1960 was estimated by the Bureau of Mines at approximately 1,193,000 tons, while actual consumption was estimated at approximately 1,346,000 tons. These figures compare with apparent consumption of 1,183,000 tons in 1959, and actual consumption of 1,463,031 tons for the same year.

NEW DEVELOPMENTS: The Anaconda Company began an $11,000,000, five-year program in Butte, Montana, to bring high-grade copper ore reserves into production from deep levels. The company also planned a $6,000,000 program for improving and enlarging the Anaconda, Montana reduction works.

Some 33 miles southwest of Tucson, in Pima County, Arizona, the Duval Sulphur and Potash Company Esperanza open-pit copper mine and 12,000-ton-per-day mill, which began operating in March, 1959, had a full year's production in 1960. Nearby, the American Smelting and Refining Company's $43,500,000 program to bring its Mission Project open-pit copper mine into scheduled production late in 1961 was well along by the end of 1960. Construction work was started in March on its $17,000,000 15,000-ton-per-day concentration plant scheduled for completion in September 1961. Stripping of the 200 feet of overburden was continued by the company. Seven miles of track to the property and one and a half miles of track on the property were laid by the Southern Pacific Company to service the Mission Project.

Ground-breaking ceremonies in July officially marked the start of construction of Bagdad Copper Corporation's $2,000,000 leaching plant and auxiliary sulphuric acid plant at Bagdad, Arizona, scheduled for completion in March 1961. This project is designed to recover 20 tons of copper per day from the low-grade oxide-ore stockpiles and from additional mined oxide ore.

Banner Mining Company's 1,020-foot deep five-compartment Palo Verde shaft was completed by Centennial Development Company. Banner then took over development of the mine and expected to increase output to 1,000 tons of ore per day by late 1961.

Production estimated at 18,000 tons per year by late 1961 is the goal set by Inspiration Consolidated Copper Company for its Christmas copper mine near Winkelman, Arizona. Sinking of the McDonald circular shaft, planned to ultimately reach 1,780 feet, and development of the mine were continued throughout the year, and the headframe was set. Design of the 4,000-ton-per-day concentrator was completed and construction was started. Inspiration acquired the Miami smelter adjacent to its concentrator from International Smelting and Refining Company. The smelter treats concentrate and cement copper from the Inspiration operation custom material, and will handle concentrate from the Christmas operation. Major additions to the company's electrolytic copper refinery were being made.

Kennecott Copper Corporation completed its $55,000,000 expansion program at Ray which resulted in a substantial increase in production capacity. Additional water necessary for the milling operations at Hayden was furnished by reclaiming mill water from tailings. A radiation detection device automatically controls the density of the solids in the large tailings thickener. An 800-foot two compartment development shaft was started by Kennecott on its claims north of Safford. Bear Creek Mining Company, exploration subsidiary of Kennecott, started a new exploration program with the staking of nearly six square miles of mining claims between the Dragoon Mountains and Tombstone.

A great number of claims were staked in a 10-mile area near Twin Buttes south of Tucson by representatives of three major mining companies, American Metal Climax Inc., Bear Creek Mining Company, and American Smelting and Refining Company. A number of test holes were drilled to depths ranging from 1,250 to 1,500 feet, exploring for copper.

Phelps Dodge Corporation, which had been exploring in the Safford area for the past few years, started exercising options on an estimated 300 mining claims which they plan to develop sometime in the future.

Transarizona Resources, Inc., completed its plant and began copper production in July from its operation south of Casa Grande, Arizona. It was reported that this plant, which uses the segregation process to recover copper from copper silicate ore, is the first such commercial application in the United States.

The Miami Copper Company mines and plants in Arizona were acquired by the Tennessee Corporation subject to a royalty interest on the copper reserves of Miami which were to be sold to institutional investors for a reported $15,000,000.

EXPANSION ABROAD: The 50 percent increase in the Mufulira output from Mufulira West, Rhodesia is expected to materialize. The new electrolytic refining at Luilu in the Congo came into production during the year.

A notable addition to world supplies in 1960 was the big mine and smelter of the Southern Peru Copper Corporation at Toquepala. Capacity is to be 140,000 tons blister per year.

In Australia, Mount Isa's blister output topped 40,000 tons for the first time and a further extension is expected to raise this to upwards of 70,000 tons by the middle of 1961.

Japan's demand for both foreign concentrates and scrap to feed its growing smelter and refinery capacity was an important feature of the world market in these grades of material. Output there recently has been running at the rate of about a quarter of a million tons a year.

OUTLOOK: The copper outlook is far from clear. So much depends on general business conditions, which business men

and economists almost unanimously agree will not improve until possibly late in the second half of 1961. Meanwhile, copper producers are taking the logical steps of curtailment of production and reduction of prices. On January 17, the producers cut their price from 30 cents to 29 cents, while the London Metal Exchange was quoting the equivalent of 27.4 cents to 28.0 cents.

Actually Phelps Dodge Corporation in Arizona, White Pine in Michigan, and Noranda in Canada began curtailment last year, as did Katanga, Mufulira and Roan Antelope mines in South Africa. Anaconda's United States and Chile mines cut their production 10 percent on January 18, 1961, and Kennecott's United States mines followed suit on February 1, 1961 with a cut of almost 13 percent. The new Southern Peru Copper Company's Toquepala mine had curtailed production on January 1, 1961 by almost 15 percent.

It would appear that Free World production had been curtailed to a point where it is in balance with consumption, and there is reason to believe that prices will stabilize between 29 and 30 cents until the copper market gets back to a normal rate of growth in a Free World economy. The new association organized to find new markets for the red metal is an encouraging step which copper producers have taken.

DIAMOND output holds close to 1959 level with record South African output

A. F. Daily
Consulting Engineer
Oakland, California

For several years the Diamond Review has been written by Mr. Antoine Moyar, Economic Counsel for Forminière, Brussels, Belgium. Mr. Moyar had again started the annual Diamond Review when he became seriously ill. Through associates, he has forwarded many of the figures used in Mr. Daily's report. The mining industry wishes Mr. Moyar a speedy recovery. Fortunately, before his illness, he had completed his latest annual book "The Diamond Industry in 1958–1959," which is the most complete and authoritative review of diamond industry published each year.

World production of diamonds during 1960, according to provisional figures, was 26,648,500 carats, virtually the same as in 1959, despite a decrease of 1,400,000 carats from Congo Republic (Belgian Congo) caused by interruptions in production during civil disturbances following granting of independence. Significant increases in production in the Union of South Africa, Sierra Leone, and Guinea offset the decrease in Congo Republic.

The Central Selling Organization controlled by DeBeers Consolidated Mines, Ltd., which markets about 85 percent of world production, announced sales in the total amount of £89,700,000, only slightly less than the record of £91,100,000, established in 1959. The difference is accounted for entirely by decrease in sales of industrial quality diamonds, reflecting a slightly reduced demand in the United States. Imports into the United States included 6,300,000 carats of crushing bort, 5,000,000 carats of industrials, 1,200,000 carats of dust, and an estimated 3,000,000 carats (equivalent rough weight) of gem diamonds.

The sales agreement between The Diamond Corporation and the Soviet government was renewed for another year, but its agreement of many years' standing with Consolidated African Selection Trust, Ltd., (Ghana) which expired in December 1960, could not be renewed as, by law, the Accra market now is the sole agency authorized to purchase and export diamonds. Reports were made of additional discoveries in the USSR; reliable statistics on production have not been released.

CONGO REPUBLIC: During the first six months of 1960 production at Bakwanga was at a record rate of 18,000,000 carats per year, reflecting very satisfactory operation of the great new central concentrator completed in December 1959. On 30 June 1960 independence was granted. As a result of civil disturbances immediately thereafter, at Bakwanga production decreased steadily and ceased on 27 August. In the latter part of October, as Congolese employees returned to work, mines were reopened gradually, and almost full scale operation was achieved there in December. In the Tshikapa district all but a few of the 55 mines were forced to shut down in July, and only about half of them were being operated at the end of the year.

Despite these interruptions, total production was a very creditable 13,452,478 carats, or 90 percent of that in 1959. Of this total an estimated 12,200,000 carats was the industrial type of diamond, crushing bort. If operations at Bakwanga continue without interruption during 1961, total production for the year may be close to 18,000,000 carats.

On 1 January 1961 Societé Minière du Bécéka (Bécéka) assumed direct control of operations at Bakwanga which had theretofore been conducted under contract by Societé Forestière et Minière du Congo (Forminière).

UNION OF SOUTH AFRICA: Production for 1960 attained the record total of 3,143,463 carats, 111 percent of that in 1959. The increase resulted primarily from continuous operation and more extensive use of block caving by DeBeers Consolidated Mines, Ltd., at the three pipe mines at Kimberley, Cape Province (Wesselton, Bultfontein and Dutoitspan). These three mines, together with the Premier at Cullinan, Transvaal (associated with DeBeers), accounted for an estimated 83 percent of diamond production in the Union. The remainder is produced by the state-operated mine at Alexander Bay and by DeBeers at Kleinzee Annex, both on the west coast of Cape Province, and by small companies and individuals at various locations in Transvaal and the interior of Cape Province.

SOUTH WEST AFRICA: Production for the year, 935,000 carats, was practically the same as during the preceding year. About 99 percent was produced by Consolidated Diamond Mines of South West Africa, Ltd., controlled by DeBeers; approximately 98 percent of the stones were of gem quality, having an average weight of about 0.85 carat per stone. DeBeers continued small scale operations in the Kaokoveld area, and acquired diamond mining rights from Diamond Mining & Utility Co. over an extended Walvis Bay-Luderitz area. Industrial Diamond Co. announced plans to purchase and commission a cutterhead suction dredge for working a 12-mile long section along the coast.

ANGOLA: The production of 1,057,000 carats by Cia. Diamantes de Angola, (Diamang), the sole authorized concessionaire, was about 41,000 carats or 4 percent higher than in 1959. About 60 percent of the diamonds are gem quality and 40 percent industrial. Geological and geophysical studies were continued, principally in the vicinity of the active mining district.

GHANA: The production of 3,088,005 carats was about 101 percent of that in 1959. Of the total Consolidated African Selec-

Mine Production of Diamonds by Countries[1] in Metric Carats for 1958, 1959, and 1960

Country	*1958*	*1959*	*1960*
Congo Republic (ex Belgian Congo)	16,673,467	14,854,156	13,452,478
Union of South Africa	2,702,250	2,838,332	3,143,463
South West Africa	904,973	930,659	935,400
Ghana	3,131,695	3,041,633	3,088,005
Sierra Leone[3]	1,468,398	1,381,446	1,962,145
Liberia	868,575	638,440	600,000[2]
Angola	1,001,236	1,015,687	1,057,000[2]
Tanganyika[3]	521,064	554,951	536,668
Central African Republic[2]	105,000	86,000	75,000
Ivory Coast	164,300	187,949	200,000[2]
Guinea[3]	117,000	657,000	1,116,500
Brazil[2]	250,000	300,000	300,000
Venezuela	90,004	94,985	70,867
British Guiana	33,090	62,328	101,003
Other producing countries[2]	10,000	10,682	10,000
TOTALS:	28,047,052	26,654,848	26,648,529

1. Excluding the USSR. 2. Estimated. 3. Exports.

tion Trust, Ltd. (CAST) produces about 43 percent, and small companies and African diggers account for the remainder. Of the diamonds mined by CAST, about 30 percent are of gem quality and the average weight is about 30 per carat. During the past 10 years CAST has made fine progress in mechanization; the mining rate increased from 0.5 cubic yards per man shift in 1950 to 2.0 cubic yards in 1960, and a significant decrease in unit cost per carat has been achieved. The second section of the Anincheche plant was completed in the latter part of the year.

Upon expiration in December 1960 of its sales contract with the Diamond Corporation, CAST became subject to a law requiring sale of all diamonds through the government agency in Accra, which has been, since 1954, the sole authorized purchaser and exporter of production from the African diggings.

SIERRA LEONE: Exports during 1960 amounted to 1,962,145 carats, which was 142 percent of the 1959 figure; about 5 percent in gem quality. Sierra Leone Selection Trust, Ltd. (SLST) accounted for 746,534 carats (13 percent above 1959) or 38 percent of the total, and African diggers produced the remainder.

The government Diamond Office (operated with cooperation of The Diamond Corporation) which is the sole agency authorized to market diamonds produced by African diggers, is proving successful and made good progress in reducing the volume of clandestine exports. A portion of the apparent increase in production is accounted for by diamonds sold and exported officially rather than illegally. The Alluvial Diamond Mining Scheme is also proving successful; during the year all or part of 20 more chiefdoms were declared for diamond mining, bringing the total up to 67, covering an area of approximately 9,000 square miles. The soundly planned and executed program of the Mines Department to improve efficiency of recovery and methods of mining has resulted in notable improvements and consequently benefits to the miners and the country.

TANGANYIKA: Diamond exports in 1960, reported as 536,668 carats, were 97 percent of those for 1959; about 45 percent are gem quality. Practically all of them were mined by Williamson Diamonds, Ltd., owned jointly by DeBeers and the Government of Tanganyika.

GUINEA: For the second successive year a very great increase in production was reported, from 657,000 carats in 1959 to 1,116,500 carats in 1960. Reliable information is not available on actual production; probably it represents a minor portion of the total, and the remainder is accounted for by diamonds that were smuggled into the country. Because of reasonable regulations and closer supervision of the trade, probably a higher proportion of the goods that entered illegally are now being exported legally. Pursuant to an agreement with the USSR, industrial diamonds are bartered for industrial equipment and other items. Early in 1961 several Soviet diamond mining technicians including two women are reported to have arrived.

LIBERIA: Exports from Liberia consisted almost entirely of diamonds smuggled in from nearby countries, as domestic production is very small. The estimate of 600,000 carats may be too high, judging from the marked increases in official figures reported for Sierra Leone and Guinea, traditional sources of diamonds exported from Liberia. Changes made by the government in the regulations governing trading in diamonds and taxes thereon were considered onerous by the traders, and some transferred their activities to Guinea.

BRAZIL: Estimated production for 1960 is 300,000 carats; official exports were 54,080 carats, the highest for a number of years. Except for two or three small organized operations, diamonds are mined by "garimpeiros," working singly or in groups, in the numerous diamondiferous districts in the country.

VENEZUELA: The production of 70,867 carats was substantially below the 95,000 carats of the previous year, partially because of unsettled political conditions. The government granted two concessions for mining of diamonds in alluvial deposits in the "reserved zone" in the Guayana region.

BRITISH GUIANA: For the third consecutive year a marked increase in diamond production occurred, from 62,328 carats in 1959 to 101,003 carats in 1960, an increase of 62 percent. It is reported that several discoveries have been made in Canona at elevations much higher than deposits previously known.

FLUORSPAR consumption reaches record high in 1960 but future is dubious

Delmus F. Cardin
Administrative Assistant
Ozark-Mahoning Co.
Tulsa, Oklahoma

From preliminary figures released by the U. S. Bureau of Mines, *Mineral Industry Surveys* for 1960, fluorspar consumption continued its upward trend re-established in 1959 after having reached a low of 494,227 tons in 1958.

A new high in consumption was established at an estimated 647,000 tons.

United States Production, Imports, and Consumption Fluorspar, All Grades, in Short Tons for Years 1957 Thru 1960

Period	Domestic				Imports		Consumption
	Production		Shipments				
	Tons	Percent	Tons	Percent	Tons	Percent	
1957	331,004	51.3	328,872	51.0	631,367	97.9	644,688
1958	328,615	66.5	319,513	64.6	392,164	79.3	494,227
1959	195,134	33.1	185,091	31.4	555,750	94.2	589,979
1960[1]	235,000	36.3	237,000	36.6	520,000	80.4	647,000

[1] Estimated.

Coupled with the consumption trend, domestic producers were able to increase their participation to an amount of some 237,000 tons, indicating an increase of 50,000 tons over 1959. Imports showed a slight decrease of 35,750 tons to 520,000 tons as compared to 555,750 tons in 1959. Even with this slight reverse, imports supplied more than 80 percent of the estimated consumption for 1960.

Consumption of fluorspar, all grades, both domestic and foreign, in the United States is reflected by the following figures released by the U. S. Bureau of Mines as Table No. 5 of its *Quarterly Fluorspar Report No. 104*.

Fluorspar Consumption—All Grades—In Short Tons

Period	Hydrofluoric Acid	Glass	Enamel	Steel	Foundry	All Other	Total
1957	328,672	32,137	5,232	243,108	15,382	20,157	644,688
1958	258,935	29,987	4,865	174,508	12,883	13,049	494,227
1959	324,519	30,360	5,566	194,230	13,529	21,775	589,979
1960[1]	276,685	22,619	4,075	172,981	9,082	14,144	499,586

[1] Nine months ended September 30.

Among the principal countries that export fluorspar, Mexico continued to be far in the lead, followed by Italy and Spain. Imports for the first nine months of 1960 from these countries to the United States were:

	More than 97% CaF_2	Less than 97% CaF_2	Total
Mexico	76,984	144,772	221,756
Italy	76,078	—	76,078
Spain	63,037	6,201	66,238

Efforts of the Independent Fluorspar Producers Association to secure some measure of relief from the crippling imports

through governmental intervention by imposition of a quota system, an increase in tariff duties, or possibly a combination, came to naught and were abandoned after the Congressional Session of 1960.

With the continued excessive ratio of import-to-domestic share in the total consumption of fluorspar, little or no inducement remains for the domestic producers (most of whom are shut down and broke) to seek additional ore reserves through prospecting and development. Though no accurate data is available to indicate the scope of domestic reserves added in 1960 to those held at the close of 1959 of some 36,000,000 tons of an average of 35 percent calcium fluoride, it is felt domestic producers have maintained a skeletonized prospecting program which at least has maintained the overall ore reserve.

While the demand for fluorspar, strengthened in 1960 by near-normal operations of the steel industry and increased requirements of the aluminum industry and for fluorine chemical compounds, is encouraging, one finds it difficult to feel assured such demand will continue during 1961, particularly so with the steel industry lagging at a 50 percent production rate at this early date, and several reports of aluminum companies' lines shutting down.

GOLD made economic headlines as United States losses created the London Gold Rush

John W. Carrington
Editor, The Northern Miner, Toronto, Canada

Gold was the Cinderella metal of 1960.

Long forgotten—to the dismay of gold miners round the world—this past year it achieved a degree of public prominence that it has seldom, if ever, known before.

The substantial and continuing withdrawals of gold from the United States Treasury from mid-year on focused attention on the yellow metal, culminating in October with the spectacular rise in the price of gold on the London Bullion Market to a peak of over $40.00 per ounce. Large quantities reportedly changed hands at the high figure but the price was short-lived. In a day or so it descended from the heady altitude to which its spectacular climb had taken it, and eventually settled in a range of 50–75¢ per ounce above the official $35.00 United States price.

Demand continued steady, though, and December turned out to be one of the most active months since the market was reopened in 1954. Under the sustained high level of demand the price started creeping up in mid-December and seemed headed for another upward spurt until vigorous measures were adopted by the government to discourage speculative trading and, particularly, buying by United States citizens. In one of his last executive acts, outgoing-President Eisenhower forbade citizens from holding gold abroad. (Ownership of gold has not been allowed in the United States since 1933.) These actions were supported by new President Kennedy who also launched a campaign to redress the balance of payments deficit.

Monetary experts are of two minds whether the measures adopted will prove effective. The line divides roughly between those who favor, and those who do not favor, an increase in the price of gold. The former are generally inclined to believe that President Kennedy's measures do not go deep enough, that inflation in the country has not been checked, and that the dollar will continue to deteriorate. On the other hand, the advocates of no price increase feel that the balance of payments deficit can be reduced to manageable proportions with no ill effects being suffered.

Except for 1957, the United States has had a deficit in the balance of payments every year since 1949. For the 11-year period, 1950–1960, the cumulative net deficit totals $21,000,000,000, or nearly $2,000,000,000 per year. Approximately half of this total deficit was experienced in the last three years during which time the gold outflow amounted to over $5,000,000,000.

The payment deficit last year was an estimated $3,200,000,000, down from the $3,800,000,000 deficit of 1959 and slightly under the $3,400,000,000 deficit of 1958. This huge deficit has been racked up despite a favorable trade balance which, in 1960, was estimated at $4,500,000,000. But the earnings on trade have been more than offset by the large outlays of private investment abroad and United States government spending on defense and foreign aid.

The huge balance of payments deficits have resulted in an accumulation of United States dollars overseas. These, in substantial amounts, have subsequently been converted into gold. Last year's gold losses totalling $1,900,000,000 compared with $1,100,000,000 in 1959 and $2,300,000,000 in 1958.

By the end of 1960, United States gold reserves had been reduced to $17,700,000,000. This figure includes $800,000,000 of International Monetary Fund gold paid over in exchange for short-term securities. This gold is returnable to the IMF. Effective gold reserves were, therefore, just under $17,000,000,000. At its peak in August, 1949, the United States gold pile had stood at $24,700,000,000. Thus, the erosion in 11 years totalled $7,700,000,000, representing over 6,500 tons of the yellow metal or roughly seven years' production from the Free World countries.

The 1960 gold outflow dropped United States reserves below outstanding short-term dollar liabilities which total an estimated $19,100,000,000. Deducting the $11,600,000,000 of gold required by law to be held as a reserve for backing the currency, there remains about $5,400,000,000 of gold available to meet international settlements. In this light the gold outflow assumed alarming proportions and called for drastic action. The new Administration has set itself to this task with a series of moves designed to increase ordinary trade balances and to cut spending abroad. It has firmly adhered to a policy of no increase in the price of gold, and has pledged that the gold backing of United States currency will be used, if necessary, to meet international commitments. However, to eliminate the gold backing at this time would probably tend to increase nervousness with respect to the dollar, rather than increasing confidence. Nevertheless, the stand taken by the Administration has temporarily, at least, brought about a reduction in the outflow of gold and reduced the price at which it trades on European markets. Whether these moves will be effective over a longer term remains to be seen.

World gold production, excluding Russia, edged over the 34,000,000 ounce mark in 1960, an increase of about 4½ percent over the previous year. The rise was almost wholly due to South Africa which again set a new all-time record in producing some 63 percent of the Free World's output. Expert opinion is that the industry has yet to reach full maturity. Output from the old Rand is declining but is more than offset by the rising production coming from the newer areas in the Far West Rand, Klerksdorp, Kinross and the Orange Free State. The newer districts now account for more than half of South Africa's production.

In Canada, production has been jogging along at around 4½ million ounces annually for the past several years. But, with prospecting and exploration effort at a low ebb, new mines are not being brought along to replace the older ones. The main producing camps at Porcupine and Kirkland Lake have, in large measure, reached their bottom limits so that operations are bound to be on a decreasing scale in the next few years.

In the United States, a four-year decline was halted when 1960 output rose three percent over the preceding year. The increase, though, was accounted for by higher recovery of by-product gold from the copper mines. This more than offset the lower output from the straight gold producers.

Old age was also catching up with Ghana's gold mines, and as the year drew to a close the government was preparing to take over five mines representing slightly more than half the country's gold production. These were mines whose British owners felt they could not be kept open under new wage conditions imposed by the Ghana government. It is debatable how long uneconomic production can be maintained under government auspices since, in at least one case, ore reserves are near exhaustion.

World Gold Production—excluding Russia

	1960	*1959*
	thousands of fine ounces	
South Africa	21,386	20,064
Canada	4,603	4,483
U.S.A.	1,657	1,603
Australia	1,073	1,075
Ghana	890	910
Other	4,400	4,325
	34,009	32,460

IRON discoveries; taconite expansion; continued study of semi-taconites highlight year

M. E. Volin
Director
Institute of Mineral
Research
Michigan College
of Mining and Technology
Houghton, Michigan

1960 can be summed up as a year of oversupply in iron ore. The shipping season got off to an early and strong start to make up stockpile shortages resulting from lost production during the prolonged strike of 1959 and to meet expected demands based on predictions of a 135,000,000-ton steel year. Virtually all of the lake fleet was put into service. The steel orders did not materialize, however, because of widespread inventory trimming, and production dropped to half capacity by midyear. By that time, there was plenty of ore to meet the falling steel demands and lake shipments were closed down. Even as the shipping season limped to an early finish, stockpiles at ports, steel mills and even at the mines were bulging. It was evident that the oversupply in 1960 would bring drastic curtailments in mining and shipping in 1961 unless steel demands should rise sharply.

The beginning of the 1961 lake shipping season is expected to find stockpiles well filled with an estimated 53,000,000 gross tons of ore, about 20,000,000 more than in a normal year. The excess will be deducted from 1961 shipments and for the most part from Lake Superior mine quotas. In anticipation of this, curtailments of work schedules went into effect at many mines in the second half of 1960, and by the end of the year some Michigan underground mines were preparing to close. Unemployment in the Lake Superior iron mining areas became as critical as anywhere in the nation.

In spite of the growing stockpiles, ore imports held at a near-record level throughout most of 1960. This was not due entirely to price-quality advantages, as many United States steel companies have large investments in foreign mines and thus have production commitments. Fears of expropriation spurred production from mines financed by United States capital in some countries facing uncertain political futures.

Domestic mine production in 1960 totalled 86,300,000 gross tons of ore, according to preliminary estimates of the United States Bureau of Mines, and 82 percent was produced in the Lake Superior region. The American Iron Ore Association reported receipts of 77,900,000 gross tons from the domestic mines, a 35 percent increase over receipts in strike-ridden 1959. Most all of the increase came from the Lake Superior mines, which shipped 62,900,000 gross tons while other United States mines shipped 15,000,000 gross tons, about the same as in the previous year. Stocks on hand at U. S. furnaces and docks from all sources totalled 73,900,000 gross tons at the end of the year, a notable increase over the 64,500,000 gross tons at the beginning of the year. Consumption of iron ore and agglomerates totalled 102,300,000 gross tons for the year, an increase of about 8 percent. Steel production was at a high rate in the first half of 1960 and totalled 60,750,000 tons of ingots and steel for castings but totalled only 38,500,000 tons in the second half as orders failed to materialize.

Minnesota mines shipped an estimated 54,700,000 gross tons, 51 percent more than in the previous year. The Minnesota shipments included 11,500,000 gross tons of taconite pellets and nodules, as compared with 8,400,000 tons in 1959. Some pellets were held in mine stockpiles for the next shipping season. Michigan iron mines shipped 10,750,000 gross tons, an increase of 21 percent. Jaspilite concentrates and pellets made up about 10 percent of the total.

The American Iron Ore Association reported total imports of 34,900,000 gross tons of ore in 1960, a slight decrease from the record 35,600,000 tons in 1959; the rate of imports dropped somewhat in the fourth quarter. The principal sources in order of tonnages supplied were Venezuela, Canada, Chile, Peru, and Brazil, these countries supplying 97 percent of the total. Imports from Canada declined 12 percent, but Venezuelan mines were operated at capacity. Imported ores can be expected to continue the inroads of previous years and become an increasing percentage of our annual ore supplies, but this trend can be changed overnight by political situations.

More than half of the domestic ores shipped in 1960 received some beneficiation. The trend toward more beneficiation became even more important as imports continued to put the pressure on and displace the domestic direct shipping ores. Beneficiation seems to be the answer in part to the challenge of the foreign ores as increased blast furnace yields continue to highlight the United States steel production picture.

Although the iron mining industry was faced with market uncertainties, important new developments were completed and others started. In Minnesota, the Reserve Mining Company announced a program to expand production to 9,000,000 gross tons of pellets per year. The Pierce mine which had been under development since 1957 came into production; the beneficiation plant includes crushing, screening, heavy media, cyclone, and spiral units. Two other open-pit mines were in the development stage, and construction was started on a 1,500,000-ton beneficiation plant to process ores from the Monroe and Sherman mines. In Michigan, the Humboldt Mining Company opened a new pelletizing plant with a capacity of 650,000 gross tons per year to serve the expanded jaspilite flotation plant. Elsewhere in the United States, the Meramec Mining Company continued work on its $40,000,000 Pea Ridge project in Missouri; production is scheduled in 1963. The American Zinc, Lead and Smelting Company and the Granite City Steel Company announced the discovery of another iron ore deposit in Missouri comparing in grade and size with the Pea Ridge. The Columbia-Geneva Steel Division of United States Steel Corporation began developing a low-grade deposit in Wyoming; production of 4,000 tons of pellets per day is scheduled for late 1962.

Magnetizing roasting as a method of beneficiating the non-magnetic oxidized iron formations moved nearer reality in Minnesota. These formations are inferred to be more extensive than the magnetic taconites and portions of them are higher grade, but they vary more in mineralogic character, texture and structure. Encouraged by the semi-taconite law enacted in the state in 1959, the M. A. Hanna Company and the Oliver Iron Mining Division of United States Steel Corporation started building pilot plants to investigate applications of magnetizing roasting to the semi-taconites; both plants will use Lurgi kilns. It is noteworthy that Minnesota's huge magnetic taconite plants started from such pilot plant investigations, though at a larger scale.

Agglomeration was the subject of much research and development aimed at cutting the cost of products of beneficiation involving fine grinding. In general, it costs as much to agglomerate the finely divided iron ore concentrate as it does to grind the crude ore and separate the iron minerals; heat requirements make up much of the cost of agglomeration when performed at the beneficiating plants. Although most iron ore concentrates are pelletized, briquetting is receiving increasing attention, and extrusion methods tested in the past are being reviewed. The possibility of combining agglomeration with reduction seems to offer advantages and perhaps prereduced agglomerates will be the blast furnace feed of tomorrow. Benefication and agglomeration are accomplished in many of the direct reduction processes. A fluidized bed technique for agglomerating fine iron ore concentrates during their reduction has been tested. Hot briquetting of partially reduced iron ores was demonstrated in a pilot plant by the Dravo Corporation. The part of iron ore technology concerned with agglomeration seems to be in a state of flux and the eventual direction is not yet well defined.

Papers presented at the 1960 International Mineral Processing Congress indicated that the Soviets are making a concerted and determined effort to investigate basic factors of the flotation phenomenon. Such research is needed to extend the range of applications of flotation to the low grade iron ores in which the oxides are very fine grained and noncrystalline.

Blast furnace technology gained as a result of studies of gas. By injecting natural gas into the melting zone to increase the hot blast temperature, metal production was increased and coke consumption reduced.

LEAD output exceeded demand as United States produced 243,942 tons for year

Charles E. Schwab
President
The Bunker Hill Company
Kellogg, Idaho

World overproduction of lead, a decline in United States consumption, coupled with steadily increasing producers' stocks of metal both in the United States and abroad, were the chief characteristics of the year 1960. Notwithstanding that output exceeded demand, the New York price remained at 12 cents during the year but was reduced from 12 cents to 11 cents per pound on December 21—this price stability undoubtedly resulting from prolonged strikes in the United States as the price decrease occurred when settlement of these strikes appeared imminent.

Despite the fact that the general level of the United States economy was in a decline, consumption of lead held up quite well compared to other business factors.

Activities concerning lead during 1960 at the level of the federal government occurred on two occasions. The import quota proclamation was reviewed by the Tariff Commission and a report submitted to the President on September 30 advising that the quotas could not be modified (that is, made less restrictive) without further serious injury being caused to the domestic lead industry. On November 25, the President concurred in the Commission's decision and the import quotas will now be in effect probably during the entire year of 1961, but are subject to review again by the Commission by next September 30. There was considerable Congressional activity concerning measures which would impose import taxes in lieu of quotas, but the only measure that prevailed in both the House and Senate was the so-called Small Producers Bill (H.R. 8860—86th Congress) which would have provided subsidy payments for United States producers who would qualify by mining 2,000 tons of lead or less per year. This measure, however, was vetoed by President Eisenhower on September 2.

The general situation with respect to lead was reviewed twice during 1960 at the United Nations level. In January and again in December, the United Nations Lead-Zinc Study Group convened in Geneva. On both occasions it was found that free world stocks of lead were anticipated to increase as estimated production was projected to exceed consumption by very significant amounts. Certain producers outside the United States, notably in Australia, Canada, Peru and Mexico, committed themselves to certain "withholding of offerings to the commercial markets," but such action did not get to the root of the problem which was excessive mine and smelter production.

Very obviously, therefore, under these conditions the United States lead mining industry continued at a very low rate of production compared to production in prior years, such as 1956. In 1959, United States mine production reached its lowest level since 1900, and 1960 established a new record as production was even lower than in 1959, although both figures were somewhat affected by strikes in these years.

It was apparent that continued interest on even a larger scale was evidenced in the activities of the Expanded Research Program for lead, sponsored by the major world producers. Unquestionably, this research program will pay off in the long run as certainly some significant break-through for the consumption of lead will occur. But such complex research activities ordinarily require considerable lead time and such a breakthrough has not yet occurred. This is not to discount the interest shown in such relatively new applications as anti-vibration lead-asbestos pads for major construction projects or the installation of continuous cable sheathing machines. Gradually these projects and others of a similar nature will show their effect on lead consumption, but the problem at the moment is one of holding present major consuming markets until a significant research break-through occurs which would find world producers operating at capacity to supply the needs of consumers.

MERCURY picture remains dismal as both prices and production decline

J. Eldon Gilbert
General Manager
Cordero Mining Company
Palo Alto, California

With the long touted "soaring sixties" rapidly turning into the "souring sixties" the mood of the United States mercury industry turned from despondency to desperation. The year 1959 was a bad year, 1960 was worse, and 1961 promised nothing better. United States mine production continued at about the same level; 31,256 flasks for 1959 and an estimated 31,500 for 1960. Published United States consumption declined by about 8,000 flasks, reported imports were off by nearly 12,000 flasks. However, in spite of this apparent reduction in consumer stock, the price declined from an average of $227.00 for 1959 to $211.00 for 1960. This reduction in price affected the industry in several ways not revealed by United States Bureau of Mines statistics: 1. The search for and development of new properties was stopped; no one now in the industry wanted to get in deeper; 2. Several marginal properties found their costs exceeding their income; suspension of these operations became imminent; 3. Mines with higher grade ore were forced to "high-grade" their properties to meet economic conditions. While this increased their immediate production, it materially reduced their future life.

The Philippine picture, too, looks very much the same. In spite of the fact that ore discovered a few years ago was expected to be in production, several problems arose; wet weather and lower grade ore, which caused the resulting production to remain close to 300 flasks per month. Probably all of this metal was exported to Japan where it was refurnaced.

Although Japanese consumption is increasing and is now in the order of 33,500 flasks per year, only about 6,000 flasks come from their own ore and the rest is imported as metal or concentrates. Probably much of these imports come from Mexico where production is continuing at last year's rate of about 21,000 flasks with very little coming into the United States.

It is believed that by the end of 1959 Italy had worked off the large inventory they were reported to have accumulated during 1958. Production has been reduced from their recent peak of 60,000 in 1958, and has probably been cut to about half this amount.

In Spain, production during the first half of the year was somewhat lower than average, but by the year's end had reached the enormous output of nearly 6,000 flasks per month. For the

year the average was probably a little less than the 50,000 flasks believed to have been produced during 1959.

At Almaden the installation of two new 100-metric-ton furnaces was completed. These two Pacific Foundry furnaces, in addition to the two previously installed, give the mine 400 tons furnacing capacity. At the present time, they are not running all four at capacity. In fact, they are probably only running two at a time. However, should the time arise that production is needed, the furnacing end of that operation is in a position to greatly expand its output.

In northern Spain, near Mieres, Astur-Belga de Minas, S. A. has recently installed a 150-ton-per-day rotary furnace of Gould design. They have long operated a European built multi-hearth furnace but have not always been satisfied with its operation. Probably the new rotary will replace the older plant and production will not change materially.

The largest mercury furnace ever constructed was installed at the Idrija Mine in Yugoslavia where a 250-ton-per-day Gould furnace was purchased to handle ore which has become too low grade for the older furnacing equipment. Yugoslavia's production will probably continue at about 10,000 flasks per year.

From an inspection of the figures available—that is production, consumption and stocks—it becomes apparent that more mercury is being produced in the world than is being consumed by industry. Apparently agencies of the United States government are acquiring metal for some unknown purpose. Just how long these acquisitions will continue is not known; hence the future of the industry is impossible to predict.

MINOR METALS field led by greater activity of magnesium and titanium

John R. Bogert
Field Editor
Mining World
San Francisco, California

ANTIMONY—Domestic mine production was approximately 650 tons, about the same as 1959, coming entirely as a by-product of processing silver-lead ores by the Sunshine Mining Company in Idaho. Imports of ores and concentrates increased about nine percent to some 15,000 tons coming mostly from Mexico, Bolivia and South Africa, and from a new mine recently opened in Guatemala.

Domestic consumption was approximately the same as 1959, a little over 13,000 tons, but primary smelter production increased some 14 percent to over 10,000 tons. Thus by the end of the year consumer and dealer stocks were higher than normal. The price of RMM brand, 99.5 percent antimony, f.o.b. Laredo, Texas, stayed a constant 29 cents per pound throughout 1960.

BISMUTH—Imports for 1960 from Peru, Mexico, Canada, and Yugoslavia increased substantially to over 900,000 pounds. This is a 100 percent increase over the 457,000 pounds imported in 1959. As usual the Cerro Corporation (formerly Cerro de Pasco Corporation) continued as the leading world producer and contributed the greater percentage of United States imports.

CADMIUM—Production of primary and secondary cadmium metal in the United States in 1960 amounted to over 10,000,000 pounds, an increase of nearly 25 percent over 1959. Consumption declined 11 percent to only 10,200,000 pounds due to the general decrease in industrial activity during the year. Total exports of cadmium metal, alloy, dross, flue dust, etc. tripled to a record high of some 2,700,000 pounds. In 1959 only 900,000 pounds were exported. Cadmium metal prices increased on January 7, 1960 from $1.40 a pound to $1.50 a pound; and increased again on September 28 to $1.60 a pound on all lots up to one ton.

CHROMIUM—All domestic production of chromite was from the Mouat mine at Nye, Montana. Except for a relatively small quantity consumed by American Chrome Company in producing ferrochromium, all output was sold to the federal government under contract. The quantity delivered to the government stockpile was about 106,000 short tons containing about 38.5 percent Cr_2O_3 valued at about $3,798,000. This compared to 105,407 short tons delivered in 1959.

MAGNESIUM—Production of primary magnesium for 1960 was 39,630 tons, up 28 percent from 1959. The defense industry continued to use the largest amounts of metal in aircraft and missiles, with the automotive industry using increasing amounts during the year.

Production of crude magnesite decreased about six percent below 1959, and production of brucite was less than half the 1959 total. Basic, Incorporated of Gabbs, Nevada, continued its expansion program begun in 1959 by installing a second rotary kiln and completing a new flotation mill to concentrate low-grade magnesite. Early in the year, Kaiser Industries Corporation started operation of its new plant at Midland, Michigan, to produce periclase and refractory grade magnesia from magnesium hydroxide. E. J. Lavino & Company began to produce periclase at its new Freeport, Texas plant.

MANGANESE—Production in the United States is estimated to be well below the 229,000 short tons produced in 1959. Metallurgical nodules were produced from carbonate ore by The Anaconda Company at Butte, Montana, and from oxide ore by Manganese, Inc. from Three Kids, Nevada.

United States imports of manganese ore were expected to be in excess of 2,500,000 short tons coming mostly from Brazil, India, Ghana, Union of South Africa, Mexico, and Republic of the Congo. This is an increase over the 2,250,000 tons imported in 1959. Manganese ore from the Urucum deposits of western Brazil were shipped to the United States during the year, while Amapa manganese was sent to both the United States and Europe.

PLATINUM—Production and use of platinum-group metals reached an all-time high during the year. As in the past, world production was led by Rustenburg Platinum Mines, Ltd., of South Africa and International Nickel Company, Ltd., of Canada, plus the large unknown production of Russia. Domestic production from placers and by-product sources increased moderately.

RARE EARTHS and THORIUM—Domestic shipments of monazite bastnasite, thorite, euxenite and other rare earths fell sharply in 1960 compared to the 1,878 tons produced in 1959. Operations at the Mountain Pass, California, property of the Molybdenum Corporation of America continued at reduced capacity throughout the year. This was the only operating property and sole source of domestic ore in the United States. The only imports for the year were a few tons of monazite from Australia. Africa, which is usually a major supplier of monazite, did not ship to the United States during 1960.

TIN—World production for 1960 (excluding USSR) was estimated to be 160,000 long tons, an increase of 14 percent over 1959 production figures.

The Texas City smelter of the Wah Chang Corporation operated throughout the year and shipped both Banka and Wah Chang brands to United States markets.

TITANIUM—The picture brightened during 1960 with domestic output and use of titanium sponge metal 15 percent higher than in 1959. Production of ilmenite concentrate reached a near record of about 750,000 tons, 18 percent higher than the previous year. Production of rutile concentrate was about 9,000 tons, the same as in 1959.

Much of the increased demand for titanium is due to the stepped-up national defense program which is requiring large quantities of titanium metal for the B-70 bomber program and the army's Davy Crockett lightweight automatic weapon. Also, increased demand is attributed to lower prices which are pushing more established engineering metals out of the market. The General Electric Company reported in 1960 that titanium is one of the least expensive materials designed into its current family of jet engines.

Accordingly, it is not surprising that titanium ingot output for 1960 was up to approximately 15,200,000 (compared to 12,000,000 in 1959), and shipments of mill products increased to about 10,000,000 pounds (up 56 percent from 1959).

MINOR NON-METALLICS declined but look forward to 1961

BARITE—Domestic production for the year was estimated at 726,000 short tons valued at $8,500,000. This was 175,000 tons less than the production for 1959, or a 20 percent decline. Output was reported from 13 States with Arkansas and Missouri leading, followed by Georgia and Nevada. Imports for the year were over 500,000 tons with Mexico the leading supplier, followed by Peru, Canada, and Greece.

A 100-ton-per-day mine and mill to process barite ores from the Apache Mountain lease was built near Van Horn, Texas, by Continental Minerals Company, and a $500,000 automatic barite processing plant was built in Houston by International Minerals & Chemical Corporation to treat ores from Missouri, Mexico and Peru. In South Carolina flotation facilities were installed at the King's Creek mill of Industrial Minerals, Inc. so that extensive deposits of disseminated ores could be treated.

FELDSPAR—Production was down slightly from 548,435 tons produced in 1959 but the industry as a whole reported a good year. The demand for ground feldspar for glass containers increased, as well as for glass curtain walls, cellular glass, and other industrial types used in the construction industry. During the year the Feldspar Corporation, the nation's largest producer, completed construction of a new flotation plant in Middletown, Connecticut, and will begin producing glass and pottery grade feldspar in 1961.

GRAPHITE—Production was down for 1960 since producers mined only crystalline graphite and none of the low-priced amorphous variety. Thus the value of domestic production rose despite a drop in total output estimated to be less than 20,000 tons. Imports for the year consisted of 41,000 tons of Mexican amorphous; 3,800 tons of Madagascar flake, and 2,800 tons of Ceylon lump. Since the shift to silicon carbide-graphite crucibles has reduced requirements for graphite, consumption will probably not increase in the immediate future.

GYPSUM—During the year crude gypsum mined in the United States amounted to some 10,000,000 short tons valued at approximately $34,700,000. This was down slightly from 1959 figures due to decreased activity in the construction industry. Imports from Canada, Mexico, Dominican Republic, Jamaica and the United Kingdom amounted to some 5,300,000 short tons, a decrease of about 12 percent from 1959.

MICA—Sales to the government under the domestic purchase program were down for 1960 and accounted to a decrease in domestic output of sheet mica. Production of ground mica was estimated to be at least 10 percent below the 1959 volume of 106,000 short tons. However, imports of all types from Brazil, India, and Malagasy Republic increased by about ten percent to over 7,800,000 pounds.

Research by the government and industry to develop substitutes for strategic block and film mica was continued during 1960 and will be emphasized in 1961. In New Mexico over 200 tons of scrap mica were produced by companies investigating pigment and shingle grade possibilities.

PERLITE—Total crude perlite sold or used in 1960 was estimated to be about 309,000 short tons, a decrease of five percent from 1959. Total value of production in 1960 declined about two percent to $2,675,000. New Mexico produced more perlite than any other state, and in December the Johns-Manville Perlite Corporation started operations at its new $1,000,000 plant at No Agua that has an annual capacity of 150,000 tons.

PUMICE—Approximately 1,900,000 short tons were produced in 1950 valued at some $5,000,000. Compared to 1959 this is a decrease of 16 percent in quantity and 15 percent in value. Arizona, with five active mines, led the nation in tonnage produced followed by California and New Mexico.

TALC and SOAPSTONE—Due to increased demand in the ceramic, paint, and insecticide industries, the combined output of talc, soapstone, and pyrophyllite was three percent higher than the record high production of 1959. During the year there was much active exploration in Hudspeth County, Texas, by seven interested companies. In Montana the Sierra Talc and Clay Company built a new grinding plant at Three Forks.

VERMICULITE—Production in 1960 was approximately equal to the 153,000 tons produced in 1959. The development of new applications (water-repellent fill and fireproofing) met with considerable success during the year, more than compensating for depressed markets in the building industries.

MOLYBDENUM output reaches all-time highs in United States and world

George O. Argall, Jr.
Editor
Mining World
San Francisco, California

Led by Climax Molybdenum Company with a record annual output—production and use of molybdenum in the United States and the rest of the world hit an all-time high in 1960. The previous high was during World War II in 1943.

See the production table for complete figures by countries. Here are the highlights: Climax output was up to 52,000,000 pounds from the record 11,680,000 tons of ore milled. Exports from the United States totalled a record 30,200,000 pounds of contained molybdenum with West Germany, United Kingdom, France, Japan, Italy, Austria, and Sweden being the largest importers. Russia exported an estimated 750,000 pounds from its estimated production of 12,000,000. Virtually all the increased production on a world basis came from the United States and Climax accounted for about 90 percent of this. The copper strike of 1959 continued into early 1960, but for the year as a whole the byproduct output from domestic copper mines was slightly higher, while the tungsten byproduct (Union Carbide Nuclear Company) was lower.

Continued expansion of tonnage milled and molybdenum recovered is ahead at Climax, Colorado where the company operated at full capacity during the year to meet the greatest demand for molybdenum in the company's history. An average of 32,221 tons of ore were mined and milled per day. The mine crews developed 10,000,000 tons of ore and placed 50,000 cubic yards of concrete, virtually completed the No. 4 shaft to develop the 629 and 929 levels to a depth of 600 feet below Storke level, and started the new No. 5 shaft at the Storke portal.

At year's end driving of the new Cerrsco Ridge adit was started as first step in developing a new mine southeast of the main ore body for a scheduled 5,000 ton per day production in 1965.

Kennecott Copper Corporation, the world's second largest molybdenum producer, reached an output of 27,426,000 pounds of molybdenite. Up from 20,967,000 in 1959 when strikes cut tonnage milled. Byproduct output continued at Utah Copper,

Mine Production of Molybdenum in Pounds by Countries For 1956, 1957, 1958, 1959, and 1960

Country	*1956*	*1957*	*1958*	*1959*	*1960*
Canada	871,000	783,739	888,264	748,566	758,507
Chile	3,121,000	3,100,000	2,972,000	3,785,000	3,500,000*
Japan	534,000	594,000	683,000	793,000	810,000
Rep. of Korea	31,000	34,000	82,000	49,000	40,000*
Mexico	33,000	40,000*	57,000	57,000	50,000*
Norway	366,000	365,000	481,000	506,000	542,000
United States	57,462,000	60,753,000	41,069,000	50,956,000	68,242,000
Yugoslavia	800,000*	462,000*	400,000*	450,000*	500,000*
Philippine Islands	0	0	0	59,100	120,000*
Russia	---	---	9,300,000*	10,000,000*	12,000,000*
Others	982,000	400,000*	100,000*	100,000*	150,000*
Total	63,200,000	66,613,000	55,958,464	67,503,666	86,712,507

* Estimated.

Nevada Mines, Chino Mines, and Braden (Chile). Virtually all the increase came from the firm's United States mines.

Anaconda Company was undoubtedly the third largest Free World producer from Chuquicamata and El Salvador, Chile.

San Manuel Copper Corporation produced a record 2,807,671 pounds of MoS_2, as both tonnage milled and molybdenite grade were higher than in previous years.

Inspiration Consolidated Copper Company recovered molybdenite by retreatment of copper concentrates; 433,681 pounds of molybdenum were recovered.

Other United States producers of byproduct molybdenum were the Morenci mine of Phelps Dodge Corporation; the Silver Bell mine of American Smelting and Refining Company; the Esperanza mine of Duval Sulphur and Potash Company where molybdenite is recovered and converted to molybdic oxide; the Bagdad mine of the Bagdad Copper Company; and the Pine Creek tungsten-copper-molybdenum mine of Union Carbide Nuclear Company.

The exploration news of the year was released by Molybdenum Corporation of America which reported that the several-year-long underground development and diamond drilling program adjacent to its old high grade vein mine at Questa, New Mexico had indicated many millions of tons assaying 0.25 percent. However, there are several large zones assaying 0.50 percent. It will, of course, require additional development of these zones, the expenditure of many millions of dollars, and several years to place such zones into production should an engineering evaluation prove favorable and the decision made for large scale production.

Climax Molybdenum Company diamond drilled in Montana as did Anaconda Company (Hall molybdenum) in Nevada during the year. Both deposits are low grade, but encouraging in view of growing demand.

The Alaskan discovery reported in this review last year 80 miles northwest of Anchorage proved to be a disappointment after several diamond drill holes.

Canadian activity was intense from British Columbia to Labrador searching for molybdenum. American Metal Climax, Inc. finished drilling of the Boss Mountain property in northern British Columbia and dropped its option. It has been reported that 35,000 feet of hole indicated mineralization 1,500 feet wide and 2,000 feet long with two higher grade zones containing 0.75 and 1.31 percent.

Also in British Columbia, Kennecott Copper Corporation and American Metal prospected in the Lime Creek, Alice Arm district. The Huestis Molybdenum Corporation, Ltd. continued exploration of its 93 claims near Pitman.

Canada's largest producer—Molybdenite Corporation of Canada, Ltd.—shipped concentrates containing 758,500 pounds of molybdenum. Two new levels at 850 and 1,000 foot depth were under development at year's end at the mine at Lacorne, Quebec, This work has been encouraging with the No. 29 vein being six feet wide. For the fiscal year ended 30 September the mill treated 215,609 tons of ore. The company sells molybdenite concentrate, molybdic acid, and lubricant grade molybdenite.

At year's end Canada gained a second molybdenite producer as Keremeos Mines, Ltd. shipped 100,000 pounds of molybdenite concentrate to Sweden. The concentrate was a byproduct of copper ore from the company's 40 ton per day flotation mill five miles northeast of Keremeos, British Columbia. Ore is mined from a vein on two adit levels.

Preissac Molybdenite Mines Limited started shaft sinking at year's end to develop its holdings 8.5 miles north of Cadillac, Quebec. The company built a new power line and erected a camp before sinking started. Reserves indicated by diamond drilling have been reported as 1,250,000 tons assaying 0.52 percent MoS_2. Molybdenite Corporation holds a substantial interest. A few miles to the south Anglo American Molybdenite Mining Corporation built surface buildings and collared a shaft for sinking to a planned depth of 350 feet. Reserves are reported to assay 0.40 percent MoS_2.

Southwest Potash Corporation (American Metal Climax) and British Newfoundland Corporation operating as a joint venture were exploring two molybdenite occurrences near Aillik Bay, Labrador.

Greatest interest in Canada was Kennco Explorations, Canada's (Kennecott Copper Corporation) Mount Pleasant discovery in New Brunswick. Tin and tungsten, in addition to molybdenum, occur in the deposit. Drilling showed widths to 55 feet of 0.4 percent MoS_2, 0.2 WO_3, and 1.0 percent tin.

Last year's excitement about molybdenite in Sardinia (Italy) and Sierra Leone has passed with no recent news to indicate commercial deposits.

The prospect under development in northern Nigeria appears to be one of the most promising of the year. See Nigerian Section.

Continued drilling in Greenland on the Mesters Vig deposit on the northeast coast has indicated 15,000,000 to 20,000,000 tons with a grade between 0.25 and 0.40 percent MoS_2. Transport and water supply problems were reported as solved.

NICKEL producers increase production capacities as consumption hits record high

Henry S. Wingate
Chairman of the Board
of Directors
International Nickel
Company of Canada, Ltd.
Copper Cliff, Canada

Consumption of nickel by the Free World will set a new high annual record for 1960, exceeding 500,000,000 pounds, an increase of over 15 percent above that of 1959.

A substantial increase in the use of nickel in Europe, was the main contributing factor. Differing from the pattern of past years, total consumption in North America, which for many years has been the world's largest market of nickel, was below that of the balance of the Free World.

Total consumption of nickel in the United States and Canada was approximately the same as in 1959.

All markets for nickel advanced during the year, with the use of nickel in stainless steels showing the greatest gain. A substantial increase was also registered for the application of nickel in electroplating, mainly as a result of the use by the automotive industry of improved techniques, permitting higher quality nickel plating.

Nickel producers of the Free World continued to increase their production capacities in 1960 and it is estimated that before the end of 1961 the total nickel production capacity, exclusive of Cuban sources, will approach 600,000,000 pounds annually. Canada will account for more than three-quarters of the Free World's total nickel production capacity in 1961.

International Nickel Company of Canada's new nickel project at Thompson, Manitoba, which is rapidly nearing completion, will contribute substantially to the anticipated increase in the nickel production capacity of the Free World. The Thompson project, which will be the world's first fully integrated nickel-producing operation, is scheduled to begin commercial operation in early 1961 and will have an annual capacity of fully 75,000,000 pounds of nickel, making it the second largest nickel operation in the world after Inco's facilities in the Sudbury district of Ontario. With the Thompson project in full operation, International Nickel's total capacity of nickel will be more than 385,000,000 pounds per year. Planned annual nickel production capacity of other Canadian producers will include 65,000,000 pounds or more of Falconbridge Nickel Mines Limited, and about 25,000,000 pounds of Sherritt Gordon Mines Limited.

The planned capacity of the French nickel company, Societé Le Nickel, with mines on the island of New Caledonia, has been estimated at about 55,000,000 pounds annually. Nickel production capacity in the United States, originating mainly from the facilities of The Hanna Mining Company in Riddle, Oregon, remains at approximately 23,000,000 pounds per year. The balance of the Free World's nickel production capacity consists largely of the capacity of Japanese refiners employing imported ores. The refining capacity of such refiners could support, if

sufficient ore is available, an annual production of 35,000,000 pounds of nickel.

Because of the political developments in Cuba, the foregoing figures do not include the planned capacities totaling about 100,000,000 pounds of the plant built by the United States government at Nicaro, Cuba, or the facilities in Cuba built by Freeport Sulphur Company. It is not possible to predict how soon there will be a resumption of nickel supply from the Cuban sources.

In spite of the slowness in industrial pickup in the United States, Free World consumption of nickel will again be at a very high level in 1961. Spurred on by intensified market and research activities, and supported by increasing supplies of the metal, industry throughout the world will be receptive to using nickel in an expanding variety of applications. The economies and technological advantages which nickel can provide should result in nickel consumption reaching new peaks in the years ahead.

PHOSPHATE production, consumption, and exports increased significantly

G. Donald Emigh
Director of Mining
Monsanto Chemical Company
St. Louis, Missouri

World production of phosphate rock was about 42,600,000 short tons, an increase of 4 percent over 1959. Domestic production was about 19,650,000 tons, an increase of 7 percent to 10 percent above 1959. Exports were the highest on record at 4,200,000 tons versus 3,420,000 tons for 1959. Domestic consumption increased about 4 percent in 1960.

Production of the three United States fields was: Florida 13,800,000 tons (up 5 percent); Tennessee 2,650,000 tons (up 3 percent to 4 percent); West 3,200,000 tons (up 6 percent to 17 percent).

The range of figures shown above reflects use of different source figures with the writer preferring the lower figures.

The most important foreign developments took place in Africa. A French organization that formerly performed the sales functions for Morocco, Algeria, and Tunisia has been dissolved, and Morocco now has its own sales group. A new sales office has been formed for combined sales of Algeria, Tunisia, Taiba and Togo. Sales increased from Morocco but declined from Tunisia and Algeria. New mines started in West Africa, Taiba and Togo. Others are being developed in Morocco and Tunisia.

Following is a summary of highlights of the three United States mining fields for 1960:

FLORIDA: About 97 percent of rock production goes into fertilizers and 3 percent into elemental phosphorus. The year saw accelerated activity of mining companies into integrated operations—mining to manufactured product. The mining companies actively pursued reserves acquisition and many exchanges of properties developed between operators.

American Agricultural Chemical Company installed a double-unit Palmetto washer to permit handling two mining operations. The first unit will be in operation with a new 34-yard dragline (largest in the field) about April 1961. The washer will differ from others in that hydrosizers will be used in place of screens to separate at 14 mesh. The company placed in operation its third electric furnace for making elemental phosphorus.

American Cyanamid at Brewster produced rock and operated its triple plant. The plant was expanded to a 200,000-ton-per-year triple capacity and plans are to double in 1961. The company engaged in a land reclamation project on two tracts.

Armour Fertilizer Works operated its mine and fertilizer plant near Bartow. They announced plans to double plant installation about 1962.

Coronet Phosphate Company, a division of Smith-Douglass Company, mined and operated their defluorinating plant at Coronet. They announced encouraging results in pilot planting their new Hollingsworth flotation process.

Davison Chemical Company, a division of W. R. Grace & Company, added a flotation section to the Bonny Lake washer, discontinued their Pauway No. 4 operation (mine and washer), and opened a new mine in the Clark James area. Production was increased 25 percent at the Bridgewood triple plant and a new sulfuric acid plant built. A new diammonium phosphate plant was started. Additional facilities to increase phosphoric acid capacity 50 percent are being installed.

International Minerals & Chemical Corporation began construction of a calcining unit at the Noralyn plant and plan on a multi-million dollar expansion in 1961 to include new mining equipment and additional wet storage and drying facilities at Noralyn. Some changes are also planned at the Achan mine washer operation.

Swift & Company expanded drying facilities and converted to gas. They expect to expand their mining and fertilizer facilities in 1961.

Virginia-Carolina Chemical Corporation started its new Clear Springs flotation plant at mid-year. It contains the first commercial installation of new triple deck vibrating tables. Particular attention was given to automation. A new sulfuric acid plant was built and the triple plant expanded to a 300,000-ton-per-year capacity. A 100,000-ton-per-year diammonium phosphate plant was to start February 1961, as well as a new calcining kiln shortly thereafter.

TENNESSEE: Mining was all on brown rock, but there will be some blue rock mined in 1961. Some 90 percent of all rock is used in electric furnaces. Hooker Chemical Company at Columbia began installation of a third electric furnace and kiln. Victor Chemical Works expanded its electric furnace plant at Mt. Pleasant and added a new kiln.

T.V.A. mined at Godwin and installed a railroad spur in Williamson County preparatory to mining in 1961. Matrix is shipped to its electric furnace plant at Wilson Dam, Alabama. Monsanto Chemical Company operated its electric furnace plant near Columbia. Virginia-Carolina Chemical Corporation mined and washed at Mt. Pleasant. International Minerals & Chemical Corporation mined near its Wales plant producing ground rock and defluorinated rock.

Armour Fertilizer plant mined matrix on a limited scale near Columbia. Several small firms produced ground rock.

WEST: Western rock is from the widespread Phosphoria formation and about two-thirds of western rock is used in electric furnaces.

The most noteworthy development in 1960 was San Francisco Chemical Company developing its open-pit Vernal, Utah, deposit and placing into operation, at year's end, its washing-flotation plant. Initial production of 200,000 tons per year is being trucked to Western Phosphate, Inc. fertilizer plant at Garfield, Utah—some 200 miles from Vernal. The company operated its open-pit mine at Leefe, Wyoming, and underground Cherokee mine a few miles south. Both ores are beneficiated at the Leefe plant. The company also opened its Diamond Gulch open-pit property in southeastern Idaho producing ground rock at its Montpelier, Idaho, plant.

J. R. Simplot Company operated the open-pit Gay mine near Pocatello, Idaho, furnishing rock both for its own fertilizer plant near Pocatello and lower grade shale for the nearby electric furnace plant of Food Machinery & Chemical Corporation. The latter installed a new system of burden preparation. J. R. Simplot Company also operated its open-pit Conda mine and washer near Soda Springs, Idaho. The company expanded its fertilizer facilities at Pocatello.

Central Farmers Fertilizer Company mined open-pit near Georgetown, Idaho, and produced both calcined rock and fertilizer (via electric furnace). Monsanto Chemical Company operated its open pit Ballard mine producing low grade shale for its electric furnace plant at Soda Springs. Valley Nitrogen Producers, Inc., installed a grinding plant at Soda Springs.

Montana Phosphate Products Company produced fertilizer

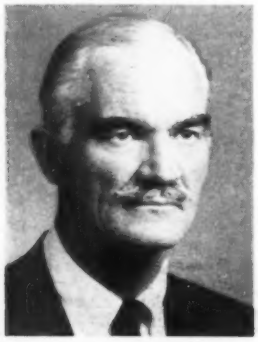
rock near Garrison, Montana. There was open-pit production from the Anderson mine and underground rock from the Anderson and Luke mines. A small underground tonnage came from the new Brock adit. The Relyea underground mine was operated near Garrison, Montana.

Victor Chemical Works, division of Stauffer Chemical Company, mined underground in the Maiden Rock area thirty miles south of its electric furnace plant at Silver Bow, Montana.

Both International Minerals & Chemical Company and Kern County Land Company were active in prospecting phosphate properties in the southeastern Idaho area.

The Bunker Hill Company had its new fertilizer phosphoric acid plant completed at Kellogg, Idaho, in June but a seven-month strike prevented start-up until January 1961. Work started on added facilities to upgrade part of the acid for Collier Carbon & Chemical Corporation. Bunker Hill carried on development work at its phosphate property near Elliston, Montana.

POTASH breaks all production and sales records; sees increased demand in 1961



Thomas W. Childs
Vice President
American Metal Climax,
New York, New York

Production and sales of potash by the domestic potash industry in 1960 again broke all records and there is evidence that 1961 may see even higher levels with all producers running near capacity. 1960 domestic potash production is estimated at 2,600,000 tons of K_2O, about 10 percent ahead of 1959. Deliveries by domestic producers were slightly in excess of 2,600,000 tons, or about 4 percent above the 1959 figure. Producers' inventories, which had fallen in the prior two years and reached a critically low point in mid-1960 just before a domestic price increase, rose in the second half of 1960 and were at the year end probably unchanged from the December 31, 1959 figure.

In recent years there has been a new dimension added to the United States potash industry: namely, the massive growth of exports. Of total 1960 deliveries by domestic producers, some 442,000 tons or 17 percent were exports. In the potash industry, the "domestic" market is commonly identified with the so-called American Potash Institute territories which include the United States, Puerto Rico, Canada, and Cuba. All other areas constitute the export market. Prior to 1954 exports were negligible. It is highly significant that domestic deliveries by United States producers in 1960 actually fell 1 percent below the 1959 level, while exports rose 37 percent.

On the other side of the coin, imports which have always been a major factor in the domestic market rose only slightly: namely, from 268,000 tons of K_2O to an estimated 273,000 tons. For the second year in a row the United States was a net exporter of potash.

The most distinguishing mark of 1960 was an apparent closing of the gap between supply and demand throughout the world. The closing gap reflects the high level or steady growth of consumption in the three principal consuming areas of the world: North America, Europe, and Japan, and as well an expanding awareness of the importance of chemical fertilizers to agricultural progress in a number of other areas such as Brazil, South Africa, the Philippines, Australia, and New Zealand. The closing gap is also evidence that expansion of production capacity has not kept pace with rising demand, a condition which appears likely to be reversed over the next two or three years as new mines and facilities referred to below are brought into production, particularly in Canada, the United States, Italy, and Israel.

From the Carlsbad, New Mexico, basin, where some 90 percent of North America's potash is produced, come the following reports:

United States Borax & Chemical Corporation is making extensive studies to evaluate alternative schemes for future potash operations, either in Carlsbad through utilization of reserves of lower grade ore, or in Canada where the company continues to hold permits. The company, in response to a growing demand for higher quality technical grade potash, has completed installations of facilities for production of a chemical grade potash of 99.9 percent purity.

Potash Company of America maintained maximum production at its Carlsbad plant. Its Canadian operation in Saskatchewan was not in production during the year due to water seepage in the shaft, but Cementation Company (Canada) Ltd. is working to control this situation by grouting and expects to complete work by mid-1961.

International Minerals & Chemical Corporation has installed additional low height mining equipment to extend the life of its Carlsbad mine and is now using ammonium nitrate blasting throughout its mine. In its surface installations the company made major process changes designed primarily to improve quality and control size of product and installed a new compactor unit for the production of granular muriate. Research and development work was continued for the further improvement of the physical specifications of its refined potassium chloride and potassium sulphate. The company's Canadian subsidiary has completed shaft work through the water-bearing Blairmore sands to the 1,450-foot level using a cast iron lining called "tubbing" to wall off the 220-foot-thick Blairmore. The remaining 1,700 feet of shaft is through limestone strata to the potash deposit. The Canadian subsidiary has virtually completed its surface refinery and expects initial production in the fertilizer year 1961–1962. It already has plans to more than double its processing capacity with construction to be scheduled in the summer of 1961.

Duval Sulphur and Potash Company began the sinking of two mine shafts to develop another potash ore body located some 14 miles from the company's present Carlsbad mine and mill. The auxiliary shaft is completed and mine development work begun, and the ore hoisting shaft and related facilities are scheduled for completion in April 1961. Ore from this new mine will be transported to the company's present mill and blended with ore from the mine now operating. In its present mine the company developed a new mining plan which allowed for a high percentage of ore extraction. Duval, like International, has adopted ammonium nitrate for underground blasting. Duval also reports increased emphasis on research and development work.

Southwest Potash Corporation's mining operations at Carlsbad were increased to meet the requirements of capacity operation of its own mill and to provide ore for shipment to National Potash Company. While there were no major changes in mining methods, additional equipment was required for the higher rate of operation. An increasing demand for muriate led to the decision to expand the mill capacity by some 30 percent. Included in the expansion program is a second compactor unit for the production of granular muriate, an additional storage warehouse, and modifications of loading and bagging facilities. Completion of this program is expected by mid-1961. A major new undertaking by the company is the construction of a $7,000,000 plant at Vicksburg, Mississippi, for the production of agricultural and industrial grade nitrate of potash and by-product chlorine. This plant is expected to be completed towards the end of 1961.

National Potash Company in its fourth year of operations at Carlsbad achieved production levels almost 50 percent above the 1959 level, blending ore purchased from Southwest Potash Corporation with its own ore. While National sells most of its product to Central Farmers Fertilizer Company under a long-term contract, it rejoined the Potash Export Association, Inc. late in 1960 and is currently exporting through that association.

Farm Chemical Resources Development Corporation, which completed a shaft at Carlsbad in 1957 to a depth of 1,695 feet, has completed an extensive laboratory and pilot program, developed a flowsheet and is now in the final stages of preliminary engineering, estimating and feasibility studies. The company's plans and schedule depend upon the outcome of these studies.

From California, American Potash and Chemical Corporation, which extracts potash from the brines of Searles Lake at Trona, reported that with the completion of its current expansion program in mid-1961 potash capacity would be increased by over 25 percent. As a part of the expansion program

new granulation facilities are being installed.

From Wendover, Utah, Bonneville Limited reported no important change in its operation of extracting potash from salts crystallized by solar evaporation.

Texas Gulf Sulphur Company late in 1960 reported its decision to begin construction immediately on a new $25,000,000 potash mine and plant in the Cane Creek area of southeast Utah. The company states that its drilling program has confirmed a very large potash deposit, of high grade ore (better than 25 percent K_2O) and good characteristics, and that its new plant will be designed to produce annually up to "well over 1,000,000 tons of muriate of potash," which would make the operation the largest potash producer in the country. The company expects to have potash in the market by about the end of 1962. Furthermore, by the end of 1963 the capacity of the new plant may be raised to well over 1,500,000 tons of annual output. Delhi-Taylor Oil Corporation, from which the potash property is being acquired by Texas Gulf, will retain a net profits' interest in the properties.

In addition to the planned new North American capacity, there is the prospect of significant additions to the Dead Sea potash operation of Israel, new Italian production, and the possibility in the more distant future of production from newly-discovered deposits in Africa: namely, Morocco and the Congo Republic (formerly French Congo).

For the coming year the potash producers appear headed for capacity operations. Their problem in 1961 should be preponderantly quantitative—to produce enough to meet demand and with improved efficiencies to meet rising costs. However, in the longer view the industry has learned that it takes more than quantity to satisfy the customer and the qualitative needs of the consumer must increasingly engage the attention of the potash producer. This will mean more research dollars, new plants, new products and higher costs.

SILVER production still behind consumption by some 67,000,000 ounces a year

J. W. Patterson
Nonferrous Metals
Specialist
Mineral Resources Division
Canadian Department of
Mines and Technology
Ottawa, Canada

Free world silver production in 1960 has been estimated by Handy and Harman as being 202,500,000 ounces, up 10 percent from production during 1959. Four countries in the Western Hemisphere accounted for about 70 percent of the production. Estimated production in millions of ounces compared to 1959 (in brackets) was as follows:—Mexico 44.0 (44.1); Canada 32.3 (31.9); United States 29.9 (31.2); Peru 25.0 (24.8). The continued decline in the United States output for the second consecutive year from its 1950–1958 average of 37,600,000 ounces was due to labor strikes at major silver and silver-lead-zinc mines in Idaho which lasted from May until the year end.

Most of the world's silver is recovered as a byproduct or coproduct of other metals. It is estimated that of all the silver produced, close to 70 percent is recovered from lead and copper ores. In Canada in 1960 about 80 percent of silver production was obtained from base metal ores, about 2 percent from gold ores, and about 18 percent from ores whose main constituent was silver. Nearly one-quarter of Canada's primary silver production is produced by United Keno Hill Mines Limited in the Yukon Territory as a coproduct of lead and zinc ores.

Free world silver consumption in 1960 as estimated by Handy & Harman at 319,300,000 ounces was 20,300,000 ounces greater than the previous year's consumption of 299,000,000 ounces. A rise in industrial consumption in West Germany and Japan, and increased coinage requirements of France and Italy accounted for most of the increase. Estimated industrial consumption in the United States was three percent below that of 1959 while the consumption in other principal free-world industrial countries remained at a high level.

In the future silver consumption can be expected to increase more rapidly than it has done in the past due to special properties which have widened its use in the electrical industry. One of its most useful properties is its ability to conduct electricity and heat with less loss than other metals. Because of this property and those of some of its alloys, increased quantities of silver are being used by manufacturers of guidance and control mechanisms for aircraft, missiles and rockets.

New uses may consume important amounts of silver in the future. Highly efficient batteries which have silver as one of their main components, are used in jet aircraft and missiles. A new alloy of silver, antimony, and tellurium is reported to have thermoelectric properties superior to other semiconductors. Silver water purification systems, successfully used in swimming pools, may some day be used by cities to purify their water supplies.

Over the past 10 years free world mine production has been lagging behind consumption at an average annual rate of about 67,000,000 ounces. During the same period the annual deficiency in the United States has been slightly over 100,000,000 ounces. This deficiency has been met in part by secondary silver returned to refineries in the form of scrap, discarded jewellery, silverware, etc., which during the period of 1953–1958, amounted to 30,000,000 ounces as estimated by the United States Bureau of the Mint. For the most part however, the deficiency is met by the use of silver held by the United States Treasury Department. In 1960 over 20,000,000 ounces were sold to industry within the United States by that department and in 1959, over 34,000,000. Withdrawals for United States coinage requirements in 1960 and 1959 amounted to about 46,000,000 and 41,000,000 ounces respectively.

Sales of silver by the United States Treasury Department to be manufactured in the United States are made possible by the Silver Purchase Act of 1946 which directs that newly mined domestic silver offered to the Mint be purchased at 90.5 cents an ounce and which authorizes the sale of silver from the Treasury's free stock at not less than 90.5 cents an ounce. Because the free market price in 1960 was fractionally higher than the Treasury Department's authorized selling price, industry continued to obtain from the Department a substantial part of its needs as indicated above and was in part responsible for the decline in the Treasury's free stock from 175,100,000 ounces at the beginning of 1960 to 123,500,000 ounces at year end.

While in recent years the free silver stocks have been drastically reduced by withdrawals in the United States for both industrial and coinage purposes, at year end they, together with outstanding amounts of lend-lease silver, amounted to approximately 167,200,000 ounces and are sufficient to satisfy both types of requirements at current levels for two to three years. Therefore, neglecting possible changes in the policy of United States Treasury Department, the outlook is for continued stable prices close to their present levels for the remainder of 1961 and possibly for a longer period.

In the long term future, however, continual deficiencies in silver production eventually will exert stronger upward pressures on silver prices. Deficiencies will continue to occur because at present price levels it is extremely unlikely that mine production will overtake consumption. Since most silver is mined either as a byproduct or a coproduct of base metal or gold ores, only moderate increases in silver production can be expected in line with increases in the production of the associated metals. Owing to present unfavorable prices for gold and base metals, increases in silver production are apt to be less rapid than in the past during periods of more favorable market conditions. There have been a number of curtailments, permanent and temporary, in the production of gold and base metals, and possibly more will be considered necessary. Hence, providing consumption remains close to its present level, silver deficiencies may actually increase, thus hastening the time when the law of supply and demand will leave no alternative other than for a higher price for silver.

Published by permission of the Deputy Minister, Department of Mines and Technical Surveys, Ottawa, Canada.

SULPHUR has a record high year with production up over six percent

J. M. Lancaster
Managing Director
The British Sulphur Corporation Limited
London, England

The most significant development in the world sulphur industry in 1960 was the reversal of the preceding three years' trend of progressive price reductions which were beginning to threaten the continued ability of the industry, as constituted today, to provide long term continuity of supply under balanced market conditions. As the result, the industry enters 1961 with a measure of market and price leadership in which the United States sulphur industry is playing a prominent part.

Free world production of sulphur in all forms rose six percent in 1960 to 18 000,000 tons sulphur equivalent, representing an increase of 6,750,000 tons or 1.8 percent per annum over the preceding decade. This rate of growth compares with 3.4 percent per annum during the first half of this century.

World production of sulphur in 1960 for the first time in many years was slightly lower than consumption primarily as the result of the policy of the United States Frasch sulphur industry to restrict its rate of production. Output in 1960 of 4,900,000 long tons was some 40 percent below the national capacity of the 14 United States domes in operation. During 1960 three new Frasch domes were brought into operation of which Freeport Sulphur Company's Grand Isle—situated seven miles offshore in the waters of the Gulf of Mexico—is the largest and represents a remarkable engineering feat in sulphur mining.

Mexico's contribution to Frasch sulphur supplies in 1960 of 1,250,000 tons—4.5 percent less than in 1959—originated almost exclusively from two producers, of whom Pan American Sulphur Company operating the prolific Jaltipan dome is the third largest producer in the world. Mexico's third Frasch sulphur producer, a subsidiary of Texas Gulf Sulphur Company, ceased operations in February 1960.

World supplies of sulphur recovered from sour natural gas, oil refining and coal gases, and derived from sulphide ore smelting operations, for the first time exceeded 2,000,000 tons. The 31 percent expansion in 1960 raised world output from this source to 2,460,000 tons. Also for the first time, France became the largest producer of recovered sulphur, despite the 11 percent increase in output in the United States where close to 60 recovery plants treating sour natural and refinery gases, turned out 725,000 long tons of high purity sulphur. Societé Nationale de Petrole d'Aquitaine, operating a gasfield at Lacq in southwest France, produced 789,400 tons of sulphur during 1960. The third and fourth stages of gas treatment and suphur recovery plant will be in full operation in May 1961, and will treat daily 700,000,000 cubic feet of sour gas (15 percent H2S) to produce 1,400,000 tons of sulphur annually.

The year 1960 was also a momentous one for Canada's natural gas and sulphur industry. As a result of favorable decisions by the Canadian authorities and the United States Federal Power Commission with regard to gas exports to the United States, Canada embarked on a number of major plant projects, pipelines, and processing of natural gas and concurrent recovery of sulphur. In 1960 eleven recovery plants, including one treating oil refinery gases produced 487,000 short tons sulphur. Eight to ten more plants are under construction and projected. Based on the anticipated level of gas supplies, sulphur production will rise from 650,000 short tons in 1961 to about 2,000,000 short tons by 1963. Canada's sulphur reserves are probably the largest in the world. It is estimated that 106,000,000 tons of sulphur are recoverable from gas reserves established at the end of 1959, and that disposable gas reserves by 1989 will contain some 326 million tons of sulphur. In addition, the Athabasca tar sands, exploitation of which has been deferred to 1962, represent apart from a vast oil reserve, a potential source of 2,100,000,000 tons of recoverable sulphur.

On a modest scale, virtually every industrialized country throughout the world provides some of its sulphur needs by recoveries ranging from a few hundred tons to 80,000 tons annually. The most prominent are Mexico, West Germany, the United Kingdom, Sweden and The Netherlands. Smelting of sulphide minerals, notably by the Orkla process operated in Norway, Spain and Portugal, contributed in 1960 some 130,000 tons of sulphur to world supplies. A contribution of increasing importance is being made by International Nickel Company of Canada treating nickel sulphide matte by a new plant and process at Port Colbourne, Ontario.

World sulphur consumption and trade reached new peaks in 1960. In the United States consumption of domestic, imported Frasch, and recovered sulphur totalled 5,000,000 long tons. This was actually more than in 1959 and the highest on record. Sulphur consumption in Western Europe rose spectacularly by about 23 percent to 2,100,000 tons. World trade of sulphur rose 18.5 percent to 3,430,000 tons of which the United States accounted for 52 percent, Mexico 36 percent, France 12 percent, and the balance from Canada, Norway and Italy.

World production of pyrites rose 4.5 percent in 1960 to 6,240,000 tons sulphur content under the stimulus of higher home consumption in most of the main producing countries, notably Japan, Spain, Portugal, and Scandinavia, plus greater import demand from the sulphuric acid industries of Western Europe. Output in Japan was the world's largest at 1,550,000 tons sulphur content while Spain produced close to 1,000,000 tons sulphur in pyrites. The two largest exporters were Spain and Cyprus. In the United States output decreased to 425,000 long tons sulphur content. In Canada the lower level of uranium ore treatment adversely affected pyrites acid demand.

Production and use of sulphur in other forms in 1960 rose only moderately (1.9 percent) to 2,790,000 tons sulphur equivalent. There was little change in the production of gypsum and anhydrite for sulphuric acid, and direct manufacture of ammomium sulphate. Production of the latter increased in 1959 when works at Ravenna, Italy and Daud Khel, Pakistan came on stream. Modest increases were recorded in sulphuric acid manufactured from spent oxide and hydrogen sulphide, as well as byproduct sulphuric acid and liquid SO2 from sulphur dioxide in copper, zinc, and lead smelter gases.

Production of sulphur in the U.S.S.R., China and Communist countries of Eastern Europe rose 7.8 percent in 1960 to 3,670,000 tons sulphur in all forms, of which two thirds is represented by pyrites. Sulphur production is estimated to have totalled 638,000 tons. About one half of the output of elemental sulphur originates from the U.S.S.R.—derived from native ores, smelting of sulphide ores and recovery from oil refinery gases—and practically all the rest originates from East Germany and China.

On December 4th, 1960, Poland officially opened a new sulphur refinery at Piaszecno based on the large reserves of native sulphur ore to be exploited by open-pit mining. From a planned production in 1961 of 114,000 tons, output is to rise to 1,000,000 tons by 1970.

Modest quantities of sulphur move from China to the U.S.S.R., and from the U.S.S.R. to other Communist countries. U.S.S.R. also exported a few thousand tons to Western Europe. With the growth of Polish sulphur production the volume of Communist bloc sulphur trade is expected to grow and exports to the West cannot be excluded.

The potential supply of sulphur in all forms—especially of Frasch and recovered sulphur—continues to exceed anticipated demand. The prospects for greater stability in the world sulphur industry are nevertheless much improved and will strengthen as the practical efforts of the Sulphur Institute—the association of producers of sulphur and pyrites formed in 1960 to promote new uses of sulphur—bear fruit. World consumption of sulphur in all forms has been rising rapidly in recent years, and the growth curve can be expected to rise more steeply if trends established in 1960, the record year for sulphur, continue.

Free World Production of Sulphur

tons—sulphur content

Country	*Pyrites*	*Brimstone*	*Other*	*Total*
1959				
W. Europe	3,315,000	949,000	1,535,000	5,799,000
Australia and Far East	1,576,000	240,000	378,000	2,194,000
Africa & Middle East	242,000	26,000	46,000	314,000
South America	1,000	50,000	20,000	71,000
North & Central America	835,000	7,026,000	761,000	8,622,000
Total	5,969,000	8,291,000	2,740,000	17,000,000
1960				
W. Europe	3,444,000	1,306,000	1,576,000	6,326,000
Australia & Far East	1,686,000	259,000	400,000	2,335,000
Africa & Middle East	245,000	33,000	46,000	324,000
South America	---	54,000	20,000	74,000
North & Central America	865,000	7,329,000	750,000	8,944,000
Total	6,240,000	8,891,000	2,792,000	18,013,000

TUNGSTEN has best year since 1951 with increases in production and consumption

Dr. Russell C. Nelson
Head, Metals Research
Sylvania Electric Products
Towanda, Pennsylvania

There was an encouraging trend for the domestic tungsten mining industry because the 1959 level was double that of 1958, and 1960 was the best year since 1951.

On the world market, tungsten concentrate prices for wolframite and scheelite were substantially unchanged during the course of the year, varying from $18.00 to $20.00 per short ton unit. Domestic scheelite prices were also very steady and ranged from $22.00 to $25.00 per short ton unit. Consequently very little concentrates were imported to the United States because domestic material was available at a lower price when the import duty was considered ($7.93 per short ton unit). Shipments of ore and concentrate during the year were estimated at 7,000,000 pounds. The domestic industry consumed about 11,000,000 pounds of tungsten, which was approximately 11 percent higher than 1959. Imports for consumption totaled about 3,200,000 pounds of contained tungsten which was 2,000,000 pounds less than in 1959.

Some minor price fluctuation was experienced on the world market in October, when the British Board of Trade accelerated its sales of stockpile material at offerings less than the current going price. However, this was considered a "one-shot" proposition, and predictions were that the Board would withdraw and return to a more gradual sales pace which would have less effect on the market price. Activity in Europe and the Far East was the best in years, and was expected to resume at a high level when the British government regulated its sales.

In the domestic mining industry Union Carbide Nuclear Corporation completed a new unit for producing ammonium paratungstate, a high-purity raw material used in the manufacture of tungsten powder for cemented tungsten carbides, lamp filaments and other electrical applications. This new plant, which went on stream early in 1960, is an extension of the refinery already in operation at the company's Bishop, California, mining and processing facilities. The process is reportedly the first direct method for producing ammonium paratungstate from scheelite ore sources. The final product is of very high purity, containing less than 0.003 percent of molybdenum or silicon.

The Tungsten Mining Corporation operation in Vance County, North Carolina, which has a past record for high production, was reactivated during 1960 after having been shut down for approximately two years. Production of wolframite concentrates continued as a by-product of molybdenite mining at the Climax, Colorado, operation of the Climax Molybdenum Corporation. Minerals Engineering's Calvert Creek operations in Montana continued to be the source of supply for its Salt Lake tungsten refinery which also produces ammonium paratungstate.

The Commodity Corporation of the United States Department of Agriculture announced in July that it was seeking an exchange of agriculture commodities for all or part of 550 tons of tungsten carbide powder. The barter requires that the tungsten concentrates must originate in friendly foreign countries, and that the processing to tungsten carbide must be done in the United States. The material which is delivered under this proposed transaction will be transferred to the supplemental stockpile. The delivery of tungsten must be completed within 22 months, with an allowable tolerance of plus or minus five percent in the weight of carbide delivered.

Extensive metallurgical research was again sponsored by the government during 1960 aimed at expanding the use of tungsten for high temperature missile and space age applications. Tungsten has the highest melting point of any metal and exhibits good strength at elevated temperatures. However, the high density of tungsten is undesirable and in the temperature range of 2000 to 3000 F. its strength-to-weight ratio is below that of other refractory alloys. Fabrication of tungsten for large structural shapes has received much government support, while other efforts have been devoted to improving its poor ductility and oxidation resistance. Tungsten alloy development to meet our long range needs, was expanded and became more active in 1960.

Fansteel Metallurgical Corporation holds a Bureau of Naval Weapons contract to develop optimum powder metallurgy techniques to produce unalloyed tungsten sheet 18 inches by 48 inches at various thicknesses. Universal-Cyclops Steel Corporation (Refractomet Division) has an Air Materiels Command contract to investigate both the powder metallurgy and arc-cast routes to ultimately yield tungsten sheet 36 inches by 96 inches. In all probability this contract will pursue the arc-cast approach. These programs have been instigated because there is an urgent need in this country for wide unalloyed tungsten sheet (more than 12 inches). At the present time wide sheet for our defense programs is imported from Europe.

TAPCO Division of Thompson-Ramo Woolridge Corporation has an AMC contract to forge a structural shape from the 85 percent W-15 percent Mo alloy. During 1960 Climax Molybdenum announced that arc-cast ingots of the 85 percent W-15 percent Mo alloy were available in sizes up to 11 inches diameter. This is the first full density alloy able to withstand temperatures over 5500 F. which is commercially available in such large sizes. The alloy is now being used in applications such as nozzles for missiles, missile vanes, and trajectory controls.

Many other aspects of tungsten were being investigated, such as methods of producing high purity metal to improve its ductility and ductile-brittle transition temperature. Both Alloyd Corporation and the National Bureau of Standards have investigated vapor deposition as a means of producing high purity tungsten. Denver Research Institute conducted a study on the effect of selected rare earth additions as scavengers for the removal of interstitial impurities. Battelle Memorial Institute approached the problem from the opposite viewpoint (on an Air Force program) and evaluated the effects of various impurities on the properties of tungsten. The Bureau of Mines worked on the production of high purity metal by the reduction of fluorides.

The use of tungsten as a possible material for rocket nozzle applications received prime attention and included efforts by General Electric (Aircraft Nuclear Propulsion Division), Stanford Research Institute and the Bureau of Mines. In this latter program rocket nozzles were being prepared by the vapor deposition of tungsten on graphite. This approach has also been developed by the Alloyd Corporation.

Although the present interest in tungsten is centered on the unalloyed metal, numerous programs were underway on the research, development and production of tungsten-base alloys. Westinghouse (Blairsville, Pennsylvania) is working on a contract to evaluate the powder metallurgy, arc-cast and skull-casting methods to manufacture tungsten alloys for rocket nozzles. General Telephone and Electronics Research Laboratories has also been working on the development of binary and ternary tungsten alloys, as well as tungsten in combination with other refractory materials, for rocket nozzles. Climax Molybdenum Corporation is pursuing the development of arc-cast tungsten alloys.

In the area of more basic research Westinghouse (Bloomfield, New Jersey) has a government contract on the physical metallurgy of tungsten and its alloys, while Union Carbide Metals Company has conducted an investigation of the properties of tungsten and its alloys. NASA and the Los Alamos Scientific Laboratory have both reported on high temperature properties of unalloyed tungsten. NASA has also conducted a preliminary study on some of the factors which influence the room temperature ductility of tungsten. The Defense Metals Information Center of Battelle has published reports summarizing the state-of-the-art on the joining and fabrication of tungsten.

Company sponsored work in similar areas is probably at least equal to the above effort. Tungsten is receiving due attention for possible use in high-temperature structural applications; much progress has been made, and the effort should continue to expand during the coming year. However, the hope for the small domestic mines is not encouraging for 1961. Large tonnage applications of tungsten must be forthcoming to change the outlooks for increased demand of tungsten ore and this is not foreseeable in 1961.

URANIUM purchases from domestic sources exceeded foreign purchases in 1960

J. W. Barnes
Deputy Director
Source Material
Procurement Division
U. S. Atomic Energy
Commission
Grand Junction, Colorado

Production of domestic uranium ores and concentrates again reached a new high. The Commission purchased more concentrates from domestic sources than from foreign sources for the first time in the uranium program. Two new mill contracts and six major amendments and extensions of existing mill contracts were executed, contributing toward the stability through 1966 of uranium mining and processing activities in several areas. Two more large nuclear power plants in this country, aggregating 290,000 kilowatts of generating capacity, started operations in 1960, including the first full-scale plant to be financed entirely by private capital.

DOMESTIC PROCUREMENT: The Commission purchased 17,637 tons of U_3O_8 in concentrates from 25 western United States mills during the year. Some 8,000,000 tons of ore were mined, at an average grade of 0.24 percent U_3O_8. Nearly half of the ore reserves depleted at this record mining rate were replaced, largely by development of ore body extensions, despite the reduced level of exploration effort since 1958. Preliminary estimates at the end of 1960 indicate a total ore reserve containing 230,000 tons of U_3O_8, compared with an estimate of 240,000 tons at the end of 1959. There were also 1,300,000 tons of ore in government and private stockpiles at the end of 1960.

Susquehanna-Western, Inc., in July 1960, signed a contract for sales of concentrates to the Atomic Energy Commission through 1966. The company is building a mill of 200-tons-daily capacity near Falls City in southeastern Texas, scheduled for completion in April or May of 1961.

Petrotomics, Inc., was given a contract covering the sale to the Atomic Energy Commission of a limited quantity of concentrates produced after March 31, 1962, from ore reserves developed prior to November 24, 1958 on the company's property in Shirley Basin, south of Casper, Wyoming. Petrotomics has decided to build a mill in Shirley Basin rather than ship its ore to an existing mill. Ore produced before April 1, 1962, may be directed to other mills or left in stockpile for future processing.

Concentrate purchase contracts amended and extended through 1966, during 1960, included those with Susquehanna-Western, Inc., Riverton, Wyoming; Dawn Mining Company, Ford, Washington; Climax Uranium Company, Grand Junction, Colorado; and Homestake-Sapin Partners, Grants, New Mexico. The Phillips Petroleum Company and Kermac Nuclear Fuels Corporation contracts which extended through 1966 were amended. Contract amendments with the last three mentioned companies contain revised delivery schedules which defer considerable quantities of uranium concentrates, originally scheduled for delivery prior to April 1962, into the 1962–1966 period. The purchases deferred to date, including those under an amendment to the Anaconda contract negotiated in 1959, total 5,050 tons U_3O_8. All of the contracts and amendments referred to above contain provisions for appropriate ore markets for the eligible captive and independent mining operations in the areas. At year's end, negotiations were under way with several other companies whose present contracts expire in 1962.

With the exception of final action for the purchase of uranium from the lignite area of North Dakota-South Dakota, the Atomic Energy Commission has completed its contracting of limited expansion of milling facilities in areas where milling capacity was inadequate for ores developed prior to November 1, 1957. In the lignite area, completion of a contract with International Resources Corporation involving the purchase of U_3O_8 produced from uraniferous lignite is pending.

Under the November 24, 1958 announcement the Atomic Energy Commission received statements claiming ore reserves on some 2,650 properties covering many thousands of mining claims. Evaluations of the eligible reserves on most of the larger deposits have been completed, and agreements on production allocations have been concluded with many of the operators.

On November 18, 1960 data were released disclosing the individual prices and quantities in current concentrate purchase contracts. The range of prices prior to April 1, 1962 varied from $7.46 to $10.70 per pound of U_3O_8. The average price for the year 1960 was $8.64 per pound. Beginning with July 1, 1960, the total quantity of U_3O_8 in concentrates contracted for under all western United States contracts as of that date was 190,674,000 pounds with an estimated cost to the Government of $1,552,800,000. Further contracting since July 1 may modify these figures.

The metallurgical efficiency of the mills continued to improve during the year. The average U_3O_8 recovery for the 25 mills in operation was 94 percent. Quality control of the product also improved and most shipments were equal to or better than specifications.

The program of bonus payments for initial production of ores from new domestic sources of uranium expired on March 31, 1960. Total payments under this program, from its inception on March 1, 1951, were approximately $18,000,000.

FOREIGN PROCUREMENT: United States purchases under its longstanding contracts were lower than in the previous year, for the first time since 1953. A total of 15,770 tons of U_3O_8 in concentrates were received, of which 11,310 tons came from Canada, and 4,460 tons from overseas. As of July 1, 1960, 50,700 tons of U_3O_8 content remained to be delivered under all outstanding foreign commitments. As in the domestic program, efforts have been directed toward "stretch-outs" or deferrals of deliveries, to bring the deliveries more in line with requirements. The Canadian stretch-out arrangement, announced in November 1959, has resulted in the deferral of 9,300 tons of U_3O_8 into the March 31, 1962–December 31, 1966 period. The Atomic Energy Commission recently announced a revision in its uranium procurement program with South Africa, under which changes were made in the pricing arrangement and delivery schedule. The original incentive cost type formula was replaced by a fixed price that is lower than the price paid during 1960 and a small deferment will be obtained in 1961 and 1962. There was no change in the total quantity to be purchased or the term of the Commission's commitment.

RADIOACTIVE HAZARDS IN MINES AND MILLS: In December a conference of the governors of the states concerned with uranium mining was held in Denver, Colorado. This conference was sponsored by the Secretary, Department of Health, Education and Welfare and was also attended by representatives of interested government agencies. The potential radiation hazards in uranium mines were discussed. Enforcement of mine safety including control of radiation hazards is principally the responsibility of the states. Most uranium producing states have established permissible concentration levels in mines for radon and its decay products.

The Atomic Energy Commission continued periodic inspection of licensed milling operations to determine compliance with regulations. Considerable improvement has been observed in the effectiveness of ventilation, dust alleviation and general cleanliness in the crushing plants and other mill areas. An interesting innovation is the installation of closed circuit television in two mills in order to permit minimum exposure of employees to dust in the operation of the crushing and sampling sections of these plants. The means for measuring and controlling exposure of mill employees to airborne radioactive materials, and the problems arising in the disposal of mill wastes, received increasing attention from the Commission, other federal agencies, the states and industry. In order to assist mill operators to evaluate mill atmospheres and mill wastes a meeting was held in Grand Junction, Colorado, in October on the subject of radiochemical analysis. The meeting was sponsored by the Commission's Division of Raw Materials and was attended by representatives of industry, the Public Health Service and state organizations.

ATOMIC POWER: The growth of the atomic power segment of the atomic energy industry has kept pace with the technological progress achieved. Experience is being gained in operating major power reactors. Until now, the principal experience in operating reactors other than experimental reactors has been either from Naval propulsion reactors, or from the Shippingport Atomic Power Station. In 1960, two more nuclear

plants produced electricity—plants with a capacity of 290,000 kilowatts. Within the next two years, 648,000 additional kilowatts of nuclear capacity will be completed. By the end of 1962, the installed nuclear capacity in the United States will be more than 1,000,000 kilowatts. Operation of these plants will help increase efficiency of design and operation, and cut costs.

This broad effort will steadily increase technical competence. However, it cannot be predicted exactly when costs will be achieved for nuclear power that can be competitive with fossil-fueled conventional plants. Three utility organizations have advised the Atomic Energy Commission that they are considering building large nuclear power plants mainly on the basis of economic considerations. These developments indicate that this country is at least close to the point where investment in large nuclear power plants in certain areas may be considered economical over the life of the plants.

This activity permits optimism on substantial uranium needs at some future time for uses other than in weapons devices.

ZINC mine and smelter output up but market sales drop; imports decline nine percent

G. C. Amstutz
Associate Professor
of Geology
Missouri School
of Mines and Metallurgy
Rolla, Missouri

Domestic zinc production went up slightly in 1960, following the rising price at the end of 1959. According to the Mineral Market Report of the United States Bureau of Mines, consumption decreased significantly in the second half of 1960, to the effect that the total consumption in 1960 was about seven to nine percent lower than in 1959. The United States is still the leading producer of zinc.

Mine production in the United States increased its output in 1960 by 13,000 tons over 1958, and 10,000 tons over 1959, to a total of 427,000 tons. Tennessee, with 76,816 tons total from January to October, continued to be by far the leading zinc producer in the nation, followed next by Idaho, Arizona, and Colorado. Mine production abroad also appears to have increased somewhat in 1960.

Smelter production also rose over production in 1959, despite the closure of smelters in late 1960, due to both labor strikes and market conditions.

Pigment, salt, and galvanized zinc from foreign and domestic production remained considerably below that of 1959.

Slab zinc sales dropped some nine percent below the tonnage of 1959, to about the level of 1954. Whereas the zinc consumption of the galvanizing industry was approximately the same as in 1959, the consumption in the industrial use for brass and dies was considerably lower. The overall trend of consumption reflects, with its marked decline, the general trend in industrial activity.

Stock trends decline in general. Producers' stocks of slab zinc, according to the United States Bureau of Mines Mineral Market Report, showed a downward trend from 154,000 tons at the beginning of the year to a low point of 137,000 tons at the end of March. A steep rise followed to 207,000 tons by August 1. By December 1 production rates reversed the trend to 182,000 tons. Consumers' stocks dropped from 100,000 to 66,000 tons reported towards the end of October 1960.

Export and import figures showed some changes compared to 1959. The overall imports of concentrates and ores in 1960 are estimated to be seven to nine percent lower than in 1959. Imports of slab zinc decreased considerably more and amount to about one-fourth less than in the previous year, whereas exports resulted in a six-fold increase. The following countries were among the main buyers: Japan, India, Sweden, the United Kingdom, and Brazil.

There has been no major change in mineral policy. Domestic zinc and lead producers asked the Tariff Commission again in 1959 to put more severe restrictions on import quotas, according to news reports. In 1960 the discussions on the importance of local domestic interests as compared to the interest and importance of a more integrated international cooperation were continued, but no change in either direction was made. Senator J. E. Murray reported that the 1958 restrictions on imports had not been sufficient to restore normal conditions in the zinc mining industry. President Koenig of the Cerro Corporation, New York, pleaded for a healthier industry and voiced strong criticism against a support of what may be considered over-aged or depleted mines. The number of foreign mines shut down because of the import quota was considerable, and had a negative effect on the export of American products. The Kennedy administration therefore seeks a better integration between foreign trade and domestic industries.

So far the United States continues to import concentrates and refined metal according to quotas established on October 1, 1958, i.e. 379,840 tons of zinc in ore and 141,120 tons of slab zinc. The legislation under which quotas were established provides for a Tariff Commission investigation and a new appraisal of the quota policy and levels at the end of two years.

On September 30, 1960, President Eisenhower was advised by the Tariff Commission report that conditions had not changed enough to justify a renewed formal investigation into the existing rules and regulations on import quotas of zinc concentrates and slabs. This may not be the last word on a rule which has lost the United States a considerable amount of sympathy abroad. The Kennedy administration may find a solution which is designed to avoid ill effects and bad feelings on both sectors, at home and abroad. The domestic industry is reported to be able to maintain a 450,000 ton output at a minimum price level of about 12.5 cents.

With reference to the current outlook, it is difficult to predict any trend because of the general uncertainties in industrial trends and commerce at the beginning of 1961. There is no immediate reason, however, to believe that there will be a drastic change in prices, stocks or consumption.

Domestic mining will tend to further decline at vein deposits which do not allow mass mining methods required to yield high productivity per unit of labor. Congruent, stratified deposits such as those of East Tennessee, the Metaline area in Washington, and the northern Tri-State area, amenable to bulk mining methods, and deposits with significant additional metal values in Au, Ag, Cd, or Cu, will be able to compete with imported ores.

There are probably no major discoveries of new deposits to be reported, except perhaps the Mattagami Lake deposits in Northern Quebec. These deposits are congruent massive sulphide bodies in greenstone tuff, possibly of volcanic extrusive or exhalative origin.

Another significant and most welcome trend is also to be reported at this time. Whereas some mining companies still have not recognized the potential long range value of their professional staff, there is in general a marked improvement in this respect. The close connection between sound and progressive work of a specialized nature in geology, mining, and metallurgy, and the efficiency and success in these fields is gradually getting more attention. While the degree of application of research is still below that of other comparable industries, the mining industry is gradually improving the quality of its professional ranks. It is also opening its doors to new and more objective approaches in exploration. At the same time, many companies recognize that to drill a hole or to drive a shaft, crosscut or drift without at the same time obtaining the maximum of geological information with well trained and experienced personnel, is a great loss of money in both short and long range terms. Whereas the present general slight recession in industry may put strain on many mining enterprises, it also excites the incentives and initiative to raise the quality and recognition of professional work. A drop in metal prices is to be matched by a drop in overhead and operating costs attained by a more mature technical and scientific approach. Some of the suggestions and examples of how to go about this cost reduction and efficiency improvement may have to be sought abroad. But an excellent example is at present being set by the new administration and the new President.

UNITED STATES mining highlights

Alaska

Gold and mercury production up from 1959; exploration activity increases

The estimated value of Alaska's total 1960 mineral production is $21,344,000, an increase of 4% over that of 1959. Gold was again the leading mineral commodity in terms of value produced; estimated production of gold in 1960 exceeded that of 1959 by 1,000 ounces. Gold production in 1960 was 109,272 ounces less than in 1950 when 289,272 ounces were produced; a decrease of 37.8% from that year. United States Smelting, Refining and Mining Company, with dredging operations at Nome, Fairbanks, Chicken, and Hogatza River, was again the leading gold producer. New York-Alaska Gold Dredging Corporation, operating at Nyac, Kuskokwim River region, made a substantial production.

Mercury production increased an estimated 707 flasks from the previous year, an increase of 19%, although value of production only increased by 10%, reflecting a decrease averaging $17.00 per flask from the 1959 average price.

Production of coal increased slightly; sand and gravel remained unchanged in value or quantity from 1959.

Platinum dredging continued during the year experiencing better than anticipated values and washing more yardage because of less clay in the ground dredged.

The total monies expended in prospecting for and exploration of metallic and nonmetallic mineral deposits in Alaska during 1960 by private interests is estimated to be $2,100,000, an increase of 36.4% from 1959. Of this total, 64% or $1,340,000 was spent in Southeastern Alaska. $160,000 (8%) in Central, and $600,000 (28%) in Northwestern and elsewhere in the State by prospecting syndicates and large mining companies.

Admiralty Alaska Gold Mining Company at Funter Bay on Admiralty Island extended its 200-foot level a distance of 2,800 feet and diamond drilled slightly more than 1,000 feet. Objective of the exploration is to intercept and further explore the copper-nickel Mertie Lode at the 200-foot level.

Columbia Iron Mining Company continued diamond drill exploration of its Union Bay magnetite-iron deposits north of Ketchikan. Packsack type drills were used, obtaining a very satisfactory core recovery of 96% to depth of 100 feet.

Mineral Basin Mining Company completed several miles of access road on its claims near Hyder to further explore deposits of gold, silver, copper, lead, zinc, and iron.

Mt. Andrew Mining Company, subsidiary of Utah Construction and Mining Company, established a camp by helicopter at Vixen Inlet, northwest of Ketchikan and diamond drilled magnetite-iron deposits optioned from Don Ross. Mt. Andrew Mining Company also continued its extensive program of drilling on iron and copper properties on Kasaan Peninsula on Prince of Wales Island.

Newmont Mining Company completed an exploration and sampling program of a molybdenum deposit at Hayes Glacier, 60 to 80 miles northwest of Anchorage.

The Federal Bureau of Mines completed additional exploration on the White Mountain mercury prospect in the Kuskokwim River region with results indicating promise of a significant deposit. The Bureau of Mines also continued its exploration of the Beluga coal field by diamond drilling.

In northwestern Alaska during 1960, major exploration of the Ruby copper prospect north of Kobuk was intensified by Bear Creek Mining Company, exploration subsidiary of Kennecott Copper Corporation.

Little Squaw Mining Company of Spokane, under direction of Eskil Anderson, did underground exploration of the Mikado gold lode deposit in the Chandalar district with very promising results.

Arizona

Copper output reached all-time high; ASARCO's Mission project proceeds

Arizona mineral production increased to a total of $410,300,000 in 1960, and was second only to the record-high of $485,000,000 set in 1956. As a result of a full year's operation of the Esperanza open-pit copper mine of Duval Sulphur & Potash Company, and increased output at several of the major mines, output of copper in 1960 was 109,003 tons greater than 1959.

The $43,500,000 program by the American Smelting and Refining Company to bring the Mission open-pit copper mine into scheduled production by 1962 was well along by the end of 1960. Construction work was started in March on the $17,000,000 concentration plant that will handle 15,000 tons per day upon completion in September 1961. Stripping of the 200 feet of overburden was continued by the company.

Ground-breaking ceremonies in July marked the start of construction of the Bagdad Copper Corporation's $2,000,000 leaching plant and auxiliary sulphuric acid plant at Bagdad scheduled for completion in March 1961.

The 1,020-foot-deep, five-compartment Palo Verde shaft of the Banner Mining Company was completed by Centennial Development Company. Banner then took over development of the mine and expect to have production of 1,000 tons a day by late 1961. Centennial Development also completed a 500-foot shaft for Cyprus Mines Corporation at the Copper Queen copper-zinc mine two miles from the Old Dick property. Development work was started and production is expected to begin in 1961.

Production estimated at 18,000 tons per year by late 1961 is the goal set by Inspiration Consolidated Copper Company for the Christmas copper mine near Winkelman. Sinking of the McDonald circular shaft and development of the mine was continued throughout the year. Design of the 4,000-ton-per-day concentrator was completed and construction started. During the year Inspiration acquired the Miami smelter from International Smelting and Refining Company.

It was reported that a new water reclamation plant, completed in June by Kennecott Copper Corporation at its Ray operation, resulted in a substantial increase in copper output from this property. The key to the improvement is a radioactive isotope gamma ray source coupled with a detection unit which automatically controls the density of the solids in the thickener. An 800-foot two-compartment development shaft was started by Kennecott on its claims north of Safford. Bear Creek Mining Company, exploration subsidiary of Kennecott, started a new exploration program with the staking of nearly six square miles of mining claims between the Dragoon Mountains and Tombstone.

Transarizona Resources, Inc., completed its plant and began copper production in July from its operation south of Casa Grande. This plant, which uses the segregation process to recover copper from copper silicate ore, is the first such commercial operation in the United States.

Phelps Dodge Corporation started a small plant at Douglas to manufacture sponge iron from the Douglas smelter slag. The sponge iron is to be used in place of detinned cans in the precipitation of copper in the leaching operations at its Copper Queen Division operation at Bisbee.

The production of uranium ore, chiefly from mines in Apache, Coconino, and Navajo Counties, increased 11 percent in quantity and one percent in value compared with 1959. However, the average grade of ore shipped declined from 0.30 to 0.27 percent uranium oxide. The new shaft at the Orphan mine on the rim of the Grand Canyon was completed to a depth of 1,850 feet, and served all portions of the mine except the adit level and the area immediately below the adit which continued to be served by the aerial tram. In April production increased to a rate of 7,500 tons compared to 4,000 tons a month at the end of 1959.

Rare Metals Corporation of America operated its 300-ton-per-day uranium processing plant at Tuba City. Crude ore for the mill was from the Orphan mine and a number of company-owned mines in the Cameron district operated under contract by the Cameron Mining Company. Cameron Mining also produced ore from a number of other mines in the district.

Colorado Fuel and Iron Corporation submitted the successful—and only—bid for an exclusive prospecting permit for iron and other minerals, including uranium, on 120,000 acres of Fort Apache Indian Reservation in Arizona.

The asbestos industry around Globe continued active during the year, and new processing plants were completed. The tonnage of asbestos sold in 1960 was comparable to that shipped in 1959 but because sales consisted of short fiber (lower price) in 1960 the total value was 26 percent below 1959.

Central

Exploration boom in Missouri; Viburnum operation begins; Tri-State still idle

KANSAS: Lead-zinc mines remained idle during the year. A small tonnage of mine-run ore was produced in gouging and clean-up operations. The major part of the recovered lead and zinc concentrates was obtained by remilling selected mill tailing that had accumulated throughout the years at the several mills in the Tri-State district.

OKLAHOMA: Mine production of recoverable lead and zinc, all from Ottawa County in the Tri-State mining district, about doubled in 1960 although the total amount was quite small. Concentrates were recovered at the Central Mill from slimes only during the year.

MISSOURI: A leasing and exploration boom highlighted the year as at least 12 major mining companies took an interest in the Missouri mineral picture. Drilling disclosed new iron and lead ore bodies in the southeastern part of the State.

Joint exploration by American Zinc, Lead and Smelting Company and Granite City Steel Company was continued in deep-lying iron oxide occurrences in Dent County and near Bourbon, Crawford County, where the drilling indicated the presence of a large deposit. Meramec Mining Company continued development of the Pea Ridge iron ore body in Washington County. The first ore was mined from a drift 1,675 feet below the collar of the development shaft, and was stockpiled. The ore body was further explored by diamond core drilling from the development level. Both the main shaft and the development shaft were advanced in depth to plus 1,600 and plus 2,000 feet respectively.

Operations of the Viburnum lead project of the St. Joseph Lead Company began in July at a rate of 3,000 tons of crude ore per day. This new source of production accounted for the increase in lead output for the state. The Herculaneum smelter announced plans to increase capacity to handle the Viburnum ore.

Silver was recovered by refining pig lead obtained in smelting lead and lead-copper ores mined in Madison and St. Francois Counties.

ILLINOIS: State production of fluorspar led the Nation furnishing over half the total domestic output for the year. Minerva Oil Company resumed operations at its Jefferson mine and began sinking a new shaft on the adjacent Fairbairn property. Wiley Cochran, owner of Tamora Fluorspar Mining Company began production from a new mine in the Karbers Ridge area.

Production of lead increased 13 percent to a total 2,900 tons for the year, while production of zinc increased 6 percent to total 28,300 tons. Chief reason for the raise in output was increased production from fluorspar mines recovering lead and zinc as byproducts. Principal lead-zinc producers were Eagle-Picher Company and Tri-State Zinc, Incorporated, with operations in northern Illinois. In southern Illinois all output was a byproduct of fluorspar mining with Aluminum Company of America, Minerva Oil Company, and Ozark-Mahoning Company being the principal producers.

ARKANSAS: The output of bauxite (2,036,000 long tons) gained an estimated 25 percent over 1959 production and accounted for 96 percent of all United States production. Reynolds Mining Corporation, with open pit and underground mines in Saline County, was the leading bauxite producer.

The zinc retort smelter of Athletic Mining and Smelting Company at Fort Smith closed down in January 1960.

Barite production declined considerably during the year. Construction of a new barite plant of United States Barite Company at Dierks was scheduled for completion in mid-1961.

Colorado

Molybdenum and uranium hit new highs; Climax opens deeper level

The atomic and space age metals—uranium and molybdenum—led Colorado's miners to all time highs in ore tonnage mined for both metals in 1960.

Climax Molybdenum Company mined and milled ore at the average daily rate of 32,221 tons to produce an estimated 52,500,000 pounds of molybdenum which was also an all time annual high. At year's end demand for molybdenum was so strong that the company announced plans to expand its mining and milling rate by 3,000 daily tons by 1963. Exploration and development of the Ceresco Ridge ore body south of the main mine was underway during the year with the hope that a new 5,000-ton-per-day mine may be developed by 1965. Development below the Storke Level was accelerated with the No. 4 shaft (winze) virtually completed while the No. 5 shaft was collared in the service yard at the portal of the Storke Level.

Eight uranium mills operated to make possible the high mining rate on the Colorado Plateau (San Miguel, Dolores, Mesa, and Montrose counties), in Gunnison County, in the Front Range (Jefferson and Fremont counties), and in Moffat County. Union Carbide Nuclear Corporation and its many sub-contractors produced by far the largest tonnage for milling at Uravan, Rifle, Maybell, and Slick Rock. Important deep mines were developed by the corporation south and west of Egnar, San Miguel County. Cotter Corporation expanded its Canon City mill to a 200-ton-per-day capacity for treatment of larger tonnages of Swartzwalder mine primary ore from the Denver-Golden Corporation's Jefferson County mine.

Most important base metal development was the start of the new 500-ton-per-day differential flotation mill built by Camp Bird Colorado, Inc. to treat complex lead-gold-silver-zinc ore from the Camp Bird mine in Ouray County. This English firm completed a maior mine development program and installed new facilities and equipment to mine this daily tonnage.

Idarado Mining Company continued normal operation of its Treasury Tunnel-Black Bear-Montana-Smuggler Union mines in Ouray and San Miguel counties. The company operated the largest differential flotation mill in the state and was the leading base metal producer.

State output of zinc which declined from 1959 production was due to the four-month strike at the Eagle mine of New Jersey Zinc Company.

The Emperius Mining Company continued production of silver-lead ore at its Creede, Mineral County mines. Development continued with favorable results. Increased exploration in the district is anticipated in light of recent recommendations of the United States Geological Survey.

At Rico, Dolores County, the Rico Argentine Mining Company's production of pyrite for its sulphuric acid plant was curtailed for two months following a fire early in the year. Acid is sold to several uranium mills. The company carried out an aggressive underground development program at its Mountain Springs, Argentine, and Falcon lead-zinc mines and operated its differential flotation mill at less than 50 percent of capacity, largely on development ore.

The most important base metal exploration program in Colorado in recent years reached a successful climax at year's end when a split of the Washington vein was hit by Standard Metals Corporation. The vein was cut at the end of the American Tunnel which Standard had rehabilitated and extended 4,500 feet to cut the vein 350 feet below the old Sunnyside mine's deepest workings. Development will continue with ore scheduled to be milled at the Shennandoah Dives mill at Silverton, nine miles from the American portal.

The Golden Cycle Corporation continued limited operations of its Carleton mill and underground gold mines in the Cripple Creek-Victor districts of Teller County. The company is one of the few remaining straight gold producers in the United States. By far the largest production came from the Bob Tail vein of the Ajax mine's 3,100 foot level (below the Carlton drainage tunnel). Average gold content of the 52,658 tons milled was 0.58 ounce gold. Only 5,244 tons of dump averaging 0.19 ounce were milled.

Interest in beryllium minerals continued at a high rate during the year with the U. S. Beryllium Corporation, the state's largest producer, reporting discovery of beryllium minerals in the old Redskin mine, Park County. At the nearby Boomer mine on Badger Flats the firm mined bertrandite ore and shipped it to the Mineral Concentrates and Chemical Company at Loveland for conversion to beryllium oxide for use in the ceramic and refractory industries.

A new open-pit iron ore mine was developed on Taylor Mountain in Pitkin County by the Pitkin Iron Corporation. Test shipments were mined and shipped before winter closed operation of this 11,500 foot high pit.

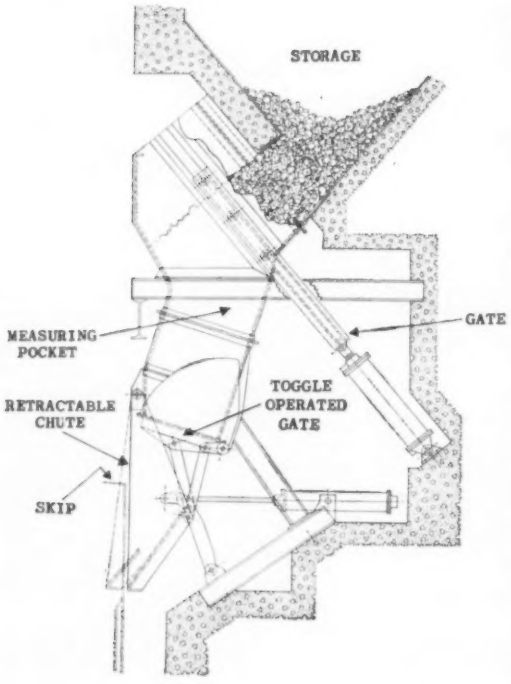
An important surface and underground exploration program was carried out by E. I. DuPont de Nemours & Company at its Powderhorn, Gunnison County, columbite claims.

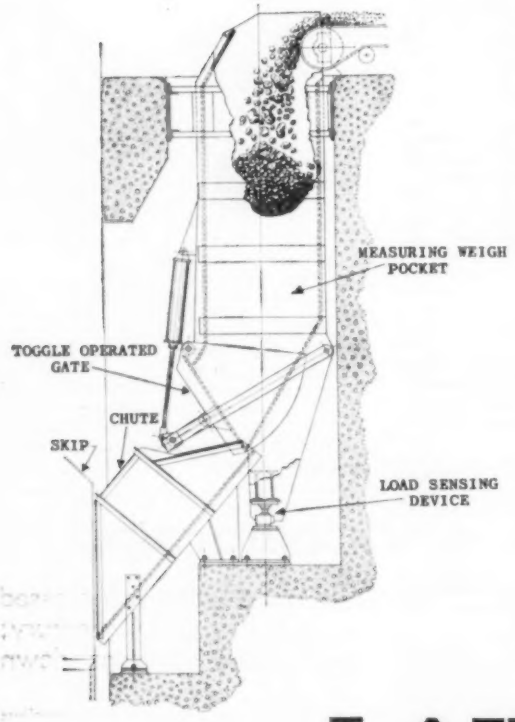
California

Iron ore shipments increased as did output of mercury; gold and silver was down

The dollar value of base and precious metals mined in California in 1960 declined again for the fifth year in a row. This was due primarily to somewhat curtailed placer gold and silver mining. How-

Automatic Skip Loaders





Patents Pending

NOW USED FOR HARD ROCK MINING IN MULTILEVEL OPERATIONS

MEASURED BY VOLUME SKIP LOADER

Upper cut-off gate is open, material from a storage bin above flows into the measuring pocket of skip loader. After a set time, the undercut type gate pushes up through the material. Any larger chunks above the gate will not impede the action of the gate . . . they will be floated to the top of the material flow line, which is governed by the angle of repose of the material.

The discharge gate between the measuring pocket and the skip is toggle operated for better flow and tight sealing when closed. Also, it conserves air required to operate the toggle gate. The weight of ore to be discharged actually aids in the opening of the gate once the linkage is past the center. Therefore, smaller cylinders can be utilized. Flow control with cam operated valves can be included so that gate action is smooth and operating impacts are virtually eliminated.

MEASUREMENT BY WEIGHT SKIP LOADER

This loader does not require the cutting off of load after material flow from the upper bins to the measuring pocket has stopped. A load sensing device causes the gate to close when the desired weight of load has been discharged into the measuring pocket.

This type of loader can be used in conjunction with other types of pocket feeding . . . conveyors, pan feeders, drum feeders or reciprocating plate feeders. When used with one of these feeders, the signal from the load sensing device shuts off a feeding mechanism when the measuring pocket has received the desired weight of material.

The automatic controls of both loading systems described above can be tied in with automatic hoist control to provide for a completely automated material hoisting system. In multilevel operation the complete system is actuated by one push button at the operating level. No other level can take over command of the skips without their being released at the level from which they have been operating. During operation from a given level, the loaders at other levels are rendered inoperative through interlevel interlocking control.

Lake Shore manufactures other loaders than those shown and can match the proper automatic loaders to your specific conditions.

LAKE SHORE, Inc.

IRON MOUNTAIN 1, MICHIGAN

ever, the picture was brightened by increased mercury output, and a slight increase in copper, lead and zinc production.

Reactivation of the Copper Bluff mine in Humboldt County was largely responsible for greater outputs of recoverable copper and zinc. Increased production of lead-zinc ore from the Santa Rosa mine in Inyo County accounted for increased lead recovery, and for an important percentage of the 1960 zinc output.

Production of iron ore and concentrates from the Eagle Mountain mine of Kaiser Steel Corporation rose above the 1959 level despite a curtailed steel industry. This was due almost entirely to increased exports of iron ore to Japan. Expansion of beneficiation facilities continued with the completion of a new fine ore crushing plant.

The decline in molybdenum followed the end of selective mining at the Pine Creek tungsten mine in Inyo County where tungsten production rose appreciably above the 1959 figure on completion of an ammonium paratungstate plant early in 1960. No activity was reported at any chromite or manganese properties during the year.

The presence of beryllium was confirmed at the Lone Pine property of White Caps Gold Mining Company where tests on selected ore showed 17.45, 16.05, 4.85, 11.00, and 14.20 percent BeO. An extensive drilling program was started in December.

Boron mineral production at the open-pit mine and refinery of The Pacific Coast Borax Division of United States Borax and Chemical Company at Boron, and the Searles Lake saline plant of American Potash and Chemical Corporation continued high during the year but did not surpass 1959 production. During the year American Potash announced an $11,000,000 expansion program to increase boron material production by 35 percent, potash production by 25 percent, as well as increasing the output of other products at the Trona plant in San Bernardino County.

The first 250-ton unit of a 1,000-ton-per-day asbestos mill was started at mid-year in Napa where Clute Corporation continued a $1,000,000 expansion of the open-pit mine and related facilities. The $5,000,000 asbestos mill of the Jefferson Mining Corporation near Copperopolis, Calaveras County, was completed in December, and is processing ore from a chrysotile deposit with reserves of some 5,000,000 tons.

Sentinel Mining Corporation started construction on a $250,000 dolomite processing plant in the Lucerne Valley close to a large dolomite deposit of high purity.

Eastern

Phosphate production up in Florida; iron and zinc output increases in New York

FLORIDA mineral production reached an all-time high in 1960 with a total estimated value of $168,000,000—an increase of three percent over 1959. The state continued to lead the nation in marketable phosphate rock production; tonnage and value both increased seven percent over 1959. Titanium ore production, including both ilmenite and rutile,

Out of many NFM cloths, one answers your problems exactly

NFM can prescribe a cloth with a "balanced formula" of characteristics that meet your filter requirements *in every detail.* Among the wide selection of special NFM cloths, you will find one with the right degree of resistance to heat, acids, alkalies, bacterial growth, abrasion, or whatever cloth-killer your process produces. For you, this variety of materials permits the choice of a cloth specifically designed to give greatly extended service, thus minimizing process interruptions, down-time, and replacement costs.

1. VINCEL* 2. SARAN 3. DYNEL 4. NYLON 5. ORLON** 6. GLASS 7. POLYETHYLENE 8. DACRON*** 9. POLYMAX* 10. TEFLON†

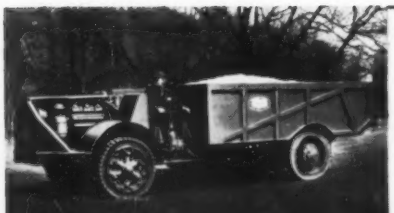
NFM ECONOMY SERVICE *goes farther than supplying cloth. It starts with expert recommendations based on years of experience. It includes making up of filter element covers from any fibers, sewed with thread of the same resistance properties as the cloth itself. Write us details of your filter operations — we will send you our "prescription" and test samples, without obligation.*

* TM — NFM Reg. U. S. Pat. Off.
** TM for duPont Acrylic Fiber
*** TM for duPont Polyester Fiber
† TM for duPont Tetrafluorethylene Fiber

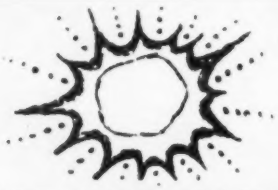
Weavers of Industrial Filter Media for over Fifty Years

NFM NATIONAL FILTER MEDIA *Corporation*

General Offices and Mills: New Haven 14, Conn.; Western Office and Factory: Salt Lake City 10, Utah, Sales Offices—Representatives: Atlanta, Ga., 990 Lindridge, N.E.; Cleveland 39, Ohio, P.O. Box 9407; Alhambra (L. A. Area), California, 20 South 1st St.; Chicago, Ill., 6034 N. Cicero Avenue; Maquinaria Minera e Industrial, S.A., Mexico, D.F., Apartado #215; Houston, Texas, 1607 Jefferson Avenue; Toronto, Ontario, C.P.R. Roadway, 1119 Yonge Street.



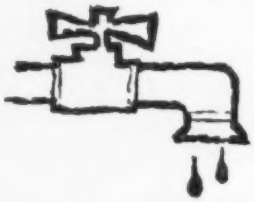
The Getman Brothers' KD-5A Scoot-Crete uses an air-cooled Deutz Diesel.



Reason: no warmup needed. Runs effectively from 40° below to 140° above (and it's approved by the Bureau of Mines.)

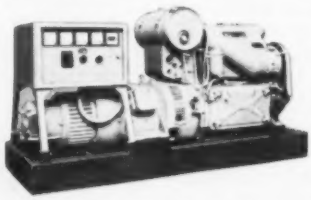
Fuel goes farther—every drop is burned.

So there's less down time—no sulphurous acid condensation—hardly ever a carbon job.

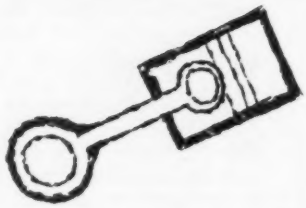


No water system; maintenance bills go down. You get full H.P. rating; no power lost for cooling.

Good reasons why Wagner ore carriers, Wagner scoopmobiles, the Jones Jackass and the Young Shuttle Buggy run on Deutz Diesels, too.



Deutz air-cooled Diesels are also used on generators, compressors, stand-by power equipment.



Complete parts and service facilities right where you need them.

PARTIAL MODEL	SPECIFICATION BHP	TABLE RPM
F1L 712	13	2300
F2L 712	26	2300
F3L 712	39	2300
F4L 712	52	2300
F6L 712	78	2300
F/A3L 514	48	1800
F/A2L 514	32	1800
A4L 514	72	2000
A6L 514	110	2000
A6L 614	110	2000
A8L 614	145	2000
A12L 614	220	2000
A6L 714	125	2000
A8L 714	168	2000
A12L 714	250	2000

Full range: 5 to 250 BHP in 1, 2, 3, 4, 6, 8, and 12 cylinders.

DEUTZ

DIESEL ENERGY CORPORATION
82 Beaver Street
New York 5, N. Y.

Please send catalogs covering the range I have checked. DEPT. MW-3

☐ 10-90 HP ☐ 100-250 HP
I am a ☐ Dealer ☐ Manufacturer
☐ Operator

Name_____

Address_____

City_____ Zone____ State_____

increased nine percent in tonnage, but the value remained the same as in 1959. A byproduct of titanium mining, zircon, showed a slight decrease in output but an increase in value. No monazite production was reported for the year.

NEW JERSEY experienced a decline in mineral production of 11 percent below 1959 to a total of $53,200,000. Shipments of iron ore fell sharply as only the Scrub Oaks and Washington mines of Alan Wood Steel Company were active. The Mt. Hope mine of Shahmoon Industries, Inc. was idle, though some shipments were made from stockpiled material. The Sterling Hill manganiferous zinc mine in Sussex County remained idle for the third consecutive year.

NEW YORK mines operated at higher levels in 1960 than the preceeding year, when most of the mines were idled for a period of months due a steel strike. The Chateaugay and Port Henry mines of Republic Steel Corporation were active at mid-year. Output of recovered lead and zinc from the Balmat and Edwards mines was higher than in 1959 as the mines operated throughout the year. Recovered byproduct silver from the Balmat mine was substantially lower than the preceeding year. Titanium concentrate (ilmenite) output increased compared with 1959. The total value of mineral production for 1960 was $247,900,000, an increase of six percent over 1959.

PENNSYLVANIA's mineral production was lower in quantity during 1960 but higher in value. Metals produced from mines in the State were iron, zinc, copper, cobalt, gold, and silver, in order of decreasing value. All of the copper, cobalt, gold, and silver were recovered as coproducts of iron mining.

NORTH CAROLINA increased production of copper, silver and tungsten during the year to raise total mineral production to a record $43,200 000, four percent above the previous high set in 1954. Copper production was 26 percent higher in quantity and 33 percent higher in value: tungsten was more than double the production and value of 1959; gold and silver production rose sharply; and a substantial tonnage of lead was also produced.

SOUTH CAROLINA increased production of vermiculite by five percent to set a new record, and increased kyanite production 13 percent. There was no appreciable change in scrap mica output, but sheet mica production continued a decline begun in 1959. Feldspar production increased 64 percent in tonnage and 82 percent in value.

VIRGINIA's mineral production totaled $213,700,000, a decrease of four percent, as production of all metallic minerals dropped from the previous year. Lead and zinc output dropped, mainly due to a labor dispute which idled the Austinville and Ivanhoe mines in August.

MINE AND METAL PRODUCTION

Please turn to the following pages for details on:

Metal and Mineral Production by States, pages 109–111.

Iron Ore Shipments from mines in Minnesota, Michigan and Wisconsin, page 96.

Open Pit Mine Tonnages at important mines, page 99.

Underground Mine Tonnages from all important mines, page 101.

Although zinc output dropped, value remained high due to increased average value per ton. No byproduct silver from the Austinville zinc mine was recovered during the year. Output and value of ilmenite, rutile, and iron ore (for pigments) was lower, while the production of manganese was discontinued entirely.

Idaho

Metal production down due to Coeur d'Alene strike; phosphate still expands

The value of mineral production declined over $14,000,000 in 1960, mainly because of a labor dispute that closed lead-zinc mines of The Bunker Hill Company and the American Smelting and Refining Company in the Coeur d'Alene mining region of Shoshone County. Permanent closure by Calera Mining Company of the Blackbird copper-cobalt mine, Lemhi County, and lower production of all non-metals except phosphate rock also reduced mineral production value.

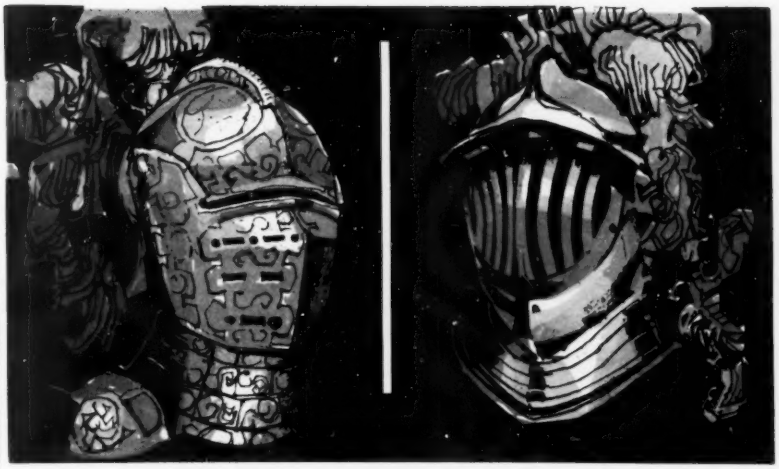
The Lucky Friday silver-lead mine, which was unaffected by the strike that closed other mines in the Coeur d'Alenes, recorded a sizable gain in output. The Star lead-zinc mine also operated throughout the year.

LEAD: A 34 percent production drop from 62,395 tons in 1959 to 41,075 tons resulted from the nearly complete stoppage of major mining and ore processing in the Coeur d'Alene region because of the labor strike. A 92 percent production increase at the Lucky Friday mine, and lesser production increases at the Sunshine Mining Company's Sunshine mine and The Bunker Hill Company's Star mine (operated by Hecla Mining Company) helped to alleviate the losses.

PHOSPHATE: In June, The Bunker Hill Company completed construction at Kellogg, Shoshone County, on a plant to produce phosphoric acid for fertilizer use. The $2,000,000 facility remained idle throughout the rest of the year awaiting settlement of the labor dispute that halted all Bunker Hill operations in the Kellogg area. In September, Collier Carbon and Chemical Corporation began construction on a $225,000 acid-concentrating plant adjacent to the Bunker Hill phosphoric acid facility. J. R. Simplot Company announced in July an expansion program that would double production capacity of its Pocatello fertilizer plant. Food Machinery & Chemical Corporation, Mineral Products Division, started a $2,500,000 modernization program that would boost productive capacity at the Pocatello elemental-phosphorus plant. By the end of the year almost 6,000,000 cubic yards of overburden had been stripped to uncover phosphate deposits near Soda Springs to supply the plant of Monsanto Chemical Company.

SILVER: Because of the northern Idaho strike, silver output dropped to 13,040,260 ounces, a decline of 22 percent from 1959. The Sunshine and Lucky Friday mines were the leading producers and accounted for 66 percent of the state total.

ZINC: Because of the Coeur d'Alene region strike, production of zinc dropped to 37,237 tons—a 33 percent decline compared with 1959. Bunker Hill Company's Star mine, operated the entire year by Hecla Mining Company, was the leading producer.



which armor shields the knight? which, the churl?

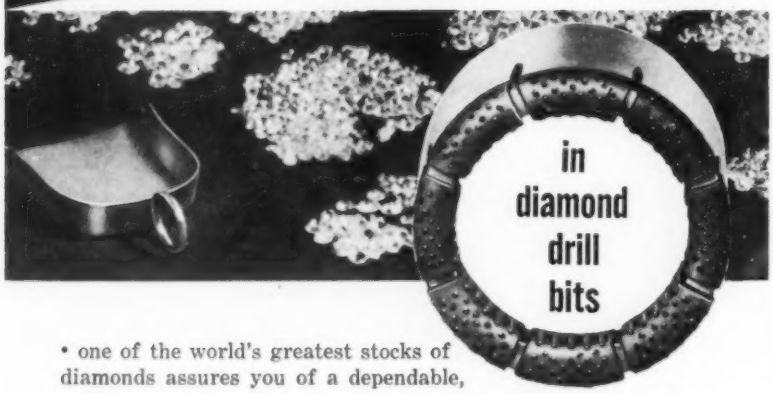
From outward appearances here sit two brave knights. But, don't let appearances fool you, for covered by one suit of armor is a churl who would turn his back and flee at the sight of hostile charger.

It is easy to be fooled by products, too. For instance, often competitive replacement parts for crushers, shovels and tractors look identical. Yet, the product of one manufacturer will outwork the competitive product two or three to one.

There is, however, one way you can be sure the replacement parts you buy produce maximum work per dollar invested . . . order job-designed Armor-Tough Columbia manganese steel replacement parts. Don't take our word for it. Order Columbia Armor-Tough parts. Compare them with the parts you have been using, and you, like all who have made the test, will, in the future, order only Columbia Armor-Tough components.

Read what one Columbia customer says.
Send for FREE Field Report No. 504.

DTR for DEPENDABILITY



• one of the world's greatest stocks of diamonds assures you of a dependable, uniform supply • honest, experienced workmanship • custom designing to suit your requirements • completely reliable performance of bits • prompt delivery • an earnest effort to help reduce your footage costs . . . including expert consultation with people who know your problems

write for Drill Bit Catalog No. 6 and interesting brochure on Industrial Diamonds.

DIAMOND TOOL RESEARCH CO., INC.
380 Second Avenue, New York 10, N. Y. GR 5-3530
MEMBER DIAMOND CORE DRILL MANUFACTURERS ASSOCIATION

Specialists in Quality Industrial Diamond Products: *Diamond Grinding Wheels • Dressers • Abrasives • Hones • Blades • Cutting Tools • Drills • Reclamation*

PACIFIC "Slushmaster" Scrapers

U. S. A. Pat. No. 2716824 — Patented Canada 1957

15 models and sizes from 26"-480# to 84"-4000#. One or more will suit your mining system. Service records over the years show that they help you move more muck at less cost.

Send for Bulletin No. 287.

Ask about these other PACIFIC Mining Products. . . They're in stock and ready for your immediate service! Sheave Anchors • Jaw Crushers • Bit Knockers • "Round-the-Corner" Sheave Blocks • Pacific Wearing Parts.

ALLOY STEEL & METALS CO.
Mailing Address: Box 58323 Vernon Sta., Los Angeles 58, Calif.

PACIFIC® MINING PRODUCTS
Built for Hard Service

PACIFIC SHEAVE BLOCKS

8 different types and sizes for every set of mining conditions. Quick opening. Extra wide throat. Load rated and proof tested. Available with various suspensions.

Send for Bulletin No. 305.

GOLD: The shut-down of the largest gold-producing operation, the Calera Mining Company's Blackbird mine, reduced State production 46 percent. Also contributing to the decline was the absence, owing to the prolonged strike, of lesser quantities normally recovered from northern Idaho base-metal mines. The Lucky Friday mine, however, unaffected by the strike, showed a 107 percent increase over the previous year and accounted for 22 percent of the state total.

BERYLLIUM: Prospecting interest in thorium deposits was eclipsed somewhat when the discovery of widespread beryllium mineralization in the Sawtooth Mountain area of south-central Idaho was announced. The discovery was made by field exploration teams of the Federal Bureau of Mines and the Idaho State Bureau of Mines and Geology, and resulted from a lead provided by a local prospector. In November the two government bureaus announced a discovery in the Yellow Jacket Mountains, 15 miles west of Cobalt and 80 miles north of the Sawtooth Mountains deposit.

ANTIMONY: The Sunshine mine of the Sunshine Mining Company recovered the total State antimony output of 650 tons as a byproduct from silver-copper ores.

COPPER: Output declined 53 percent to only 4,060 tons. The shut-down of the Blackbird mine of the Calera Mining Company, and the Coeur d'Alene region strike were responsible for the drop.

IRON ORE: A bright note in the metals picture was a 60 percent increase in iron ore shipments. Production went to an eastern Washington cement plant, and to several steel plants in Oregon and Washington.

MERCURY: Output for the year dropped eight percent. Rare Metals Corporation of America, near Weiser, was the sole producer, increasing company production 4 percent over 1959. The Holley Minerals Corporation operations near Weiser were idle.

THORIUM: The 1959 rush of thorite claim location and promotion activity abated somewhat as major companies began exploration. There were no commercial shipments of thorium-bearing ores or concentrates during the year. Nuclear Fuels & Rare Metals Corporation mined several hundred tons of thorite ore from a property near Tendoy, shipping it to a mill near Salmon that was leased from Salmon River Uranium Development Corporation. Rare Metals Corporation of America conducted exploratory work at properties in the Salmon area, leased in 1959 from Agency Creek Thorium & Rare Metals Corporation.

TITANIUM: Stockpiled ilmenite dredge concentrate was reprocessed at the J. R. Simplot Company Boise plant to produce 2,032 tons of ilmenite for high density concrete and roofing granules.

TUNGSTEN: Small-scale mining and milling were resumed late in the year by Salmon River Scheelite Corporation at the company mine on Thompson Creek, near Clayton, and exploratory work was continued. No shipments of tungsten concentrate were made.

CLAYS: J. R. Simplot Company in February completed construction on a $1,500,000 clay beneficiation plant at Bovill, Latah County. The installation called "Miclasil Operations", was constructed to beneficiate a mixture of clay, quartz, and mica to products suitable for use as paper-clay and glass-sand. The sand section of the plant began operating in February. The clay section began test operations in October.

Lake Superior

Iron ore output up; Hanna and Oliver study semi-taconites; Reserve expands

Iron ore shipments from the Lake Superior region increased over 50 percent compared to 1959, due to an uninterrupted operating season. Also, a record 11,500,000 tons of taconite concentrate were shipped in 1960 compared with 8,400,000 tons in 1959. In Michigan, shipments of jaspilite concentrate, a low-grade nonmagnetic ore, continued to increase and represented a record 10 percent of total state iron ore shipments.

Encouraged by the passage of the Minnesota semi-taconite tax law in 1959, The M. A. Hanna Company and Oliver Iron Mining began construction of pilot plants near Cooley and Coleraine, respectively, to experiment with semi-taconites. Each plant will use a Lurgi kiln to convert the non-magnetic ore to magnetic form for subsequent processing by magnetic separation. The Hanna plant will have a capacity of 10 tons per hour, and the Oliver plant 2 tons per hour.

After settlement of its longstanding royalty dispute with Mesabi Iron Company, Reserve Mining Company announced plans to increase its Silver Bay plant's capacity to about 9,000,000 tons of taconite pellets per year. Plans include construction of a second primary crushing plant at Babbitt, double tracking the 47-mile railroad connecting Babbitt and Silver Bay, and constructing new fine grinding, concentrating, pelletizing, and power facilities at Silver Bay. The expansion program is expected to cost $120,000,000.

In April, The M. A. Hanna Company made initial shipments of ore from the Pierce mine, which had been under development since the summer of 1957. A new beneficiation plant having crushing, screening, heavy-media, cyclone, and spiral units was completed early in the year. Development work was underway at the Sargent mine, a former underground mine near Keewatin, which Hanna plans to convert to open-pit mining. The company is also reopening the Mississippi No. 1 mine which will be operated in conjunction with the Sargent.

Jones & Laughlin Steel Corporation began shipments from its Lind-Greenway mine near Grand Rapids. The company was also engaged in developing a sizable addition to the Hill-Annex mine at Calumet.

Oliver Iron Mining began construction of a new concentrator adjacent to its Sherman ore-sizing plant near Chisholm. The plant, with an annual capacity of 1,500,000 tons of concentrates, will process ores from the Monroe and Sherman groups of mines. The new plant is expected to be completed in 1961.

Pickands Mather & Company ceased operations at the Scranton mine near Hibbing in June. However, W. S. Moore Company obtained a 25-year lease on that state-owned property, and plans to conduct tests to determine whether the low grade ore in the mine can be beneficiated into a competitive product. Pickands Mather & Company reopened the Corsica mine which had been closed since 1954. A second screening plant was constructed at the company's Embarrass mine. The company also continued testing new mechanized equipment at the Albany underground mine.

Late in the year Inland Steel Company acquired complete ownership of Pacific Isle Mining Company, in which Inland previously held a 50 percent interest. North Range Mining Company began development of a new open-pit mine, an extension of the old Leonidas mine, near Eveleth.

In Michigan, the Humboldt Mining Company (jointly owned by Cleveland-Cliffs Iron Company and Ford Motor Company) opened a new plant in September to produce iron-ore pellets from jaspilite. The plant has an annual capacity of 650,000 tons of pellets.

In Wisconsin, iron ore was produced at a continuous and relatively uniform rate throughout the year. Production was from the Cary mine, operated by Pickands Mather, and the Montreal mine, operated by Oglebay, Norton & Company in Iron County. Some ore was shipped from stockpile from the Meress open-pit mine in Florence County by Zontelli Brothers Division of Pittsburgh Pacific Company.

Slightly higher market prices for lead and zinc, and need for a supply of zinc concentrates at the smelters of the producing companies led to a considerable increase in production of these two metals from Wisconsin mines in 1960.

The Eagle Picher Company operated the Birkett-Bastian-Andrews mine and Shullsburg mine and mill throughout the year except for the period of a labor strike, October 1–31; and the Linden mine and mill from March on, except during October. American Zinc, Lead and Smelting Company's Vinegar Hill Division operated through the year. Piquette Mining & Milling Company operated from January through June, and resumed operations in December.

New Jersey Zinc Company started sinking an inclined shaft and construction of a mill in the development of a zinc mine near Elmo, Lafayette County. Production is scheduled for 1961. The Mifflin Mining Company reactivated its Coker mine near Mifflin, Grant County, in December. Cerro Corporation (formerly Cerro de Pasco Corporation) and Bear Creek Mining Company (exploration subsidiary of Kennecott Copper Corporation) conducted exploration for copper ores in Douglas County.

Montana

Copper output increases while lead and zinc decline; Anaconda announces plans

Mineral production increased for the year reversing a three-year decline for the state. The 1960 total value was the third highest on record (exceeded only in 1956 and 1957). Production of copper gained, and was more than enough to offset lower lead and zinc production resulting from poor market conditions and a strike at the Jack Waite mine.

Production of several non-metals increased, including feldspar, gypsum, mica, phosphate rock, and pyrite. Output of barite and talc declined.

The Anaconda Company began an $11,000,000, five-year program to bring

Vulcan IRON WORKS CO.
IN DENVER SINCE 1891
2960 SOUTH FOX STREET
ENGLEWOOD, COLORADO

VULCAN SLOPE ROLLERS
• Rubber or Neoprene
• REPLACEABLE Segments
• Sealed Ball Bearings
Cat. No. 117

VULCAN MINE SHEAVES
• Cast Steel or Meehanite
• Flame Hardened Grooves or Replaceable Liners
Cat. No. 117

VULCAN MINE HOISTS
• Small, Medium or Large
• Single, Double or Divided Drum
Cat. No. AC 6002

VULCAN AUTOMATIC OR PUSH BUTTON OPERATED HOISTS
Now economical for production in small mines, or man service in large mines.
Catalog No. AC 6002

VULCAN SKIPS & CAGES
• Bottom Dump or Vertical Skips
• Aluminum or Steel Const.
• Rubber Guide Wheels
Cat. No. DA 6010

VULCAN SLUSHER HOISTS
• 10-150 HP—Standard or Special Design
• Single, Double or Triple Drum
Cat. No. DB 5709

VULCAN CHAIN SAWS
Air or electric powered
Cat. No. JB 5805

ALIMAK RAISE CLIMBER
SAFER
CHEAPER
EASIER
Built-in air and waterlines remote control valve stations.
Write For Literature

CASTINGS, MACHINING, CUSTOM FABRICATIONS
Special Designs of All Equipment
VULCAN IRON WORKS CO.
2960 South Fox Street
Englewood, Colorado

Iron Ore Shipments in Gross Tons from Minnesota, Michigan, and Wisconsin by Companies and Mines for 1958, 1959, and 1960

Company Mine	1958	1959	1960
CLEVELAND CLIFFS IRON CO., THE			
Athens-			
Bunker Hill	217,414	226,215	240,675
Cambria	33,385	22,292	- - -
Cliffs Shaft	421,020	402,906	300,934
Humboldt	108,912	79,357	128,200
Maas	216,154	192,420	398,567
Mather	1,231,170	1,229,631	1,905,640
Ohio	- - -	- - -	34,226
Tilden	81,079	167,046	214,628
Canisteo	562,483	346,549	404,868
Hawkins	404,280	366,438	683,359
Hill-Trumbull	33,281	310,192	516,221
Holman-Cliffs	809,645	467,648	596,020
Sally	276,859	176,753	374,838
Wanless	16,010	- - -	- - -
Republic	518,361	397,519	628,312
Total Shipments	4,932,053	4,384,966	6,227,488
ERIE MINING COMPANY			
Erie	2,691,482	4,088,155	5,733,845
HALEY-YOUNG, YOUNG-MONTANA, & E.A. YOUNG, INCORPORATED			
Minnewas	59,822	37,081	45,739
Elbern	57,175	36,516	40,432
Grant	968	- - -	- -
Willow Creek	- - -		34,888
Total Shipments	117,965	73,597	121,059
M.A. HANNA COMPANY			
Cannon	610,358	450,232	746,727
Hiawatha	425,918	355,249	490,740
Homer	276,087	360,116	626,343
Wauseca	570,106	360,330	670,866
Bray	277,344	205,675	127,591
Gordon	552,773	335,774	214,245
Messabi Chief	23,654	63,479	37,695
Mississippi #3	297,701	145,723	300,970
Enterprise	455,067	223,237	311,687
Brunt	948	- -	2,906
Impro "H"			11,728
Norpac	- -		684,366
Argonne Leach	345,802	226,481	74,980
Douglas	13,297	136,862	282,322
Duncan	66,103	89,481	222,297
Harrison	2,675	3,078	53,654
North Harrison	- -		1,982
Sargent	- -		204,819
Roy	-		7,701
Halobe	34,726	20,854	- -
Quinn	22,717	1,338	18,813
Olson Lot #1	272,962	45,942	134,891
Shiras			21,117
Silver			227
Patrick	622,066	456,931	771,774
Patrick Annex	234,708	122,184	306,705
Kevin	41,313	19,464	40,584
Aromac	47,280	- - -	- - -
Weggum	280,474	69,676	178,876
Weggum So. Longyear	20,148	56,823	75,561
South Agnew	123,692	97,422	336,254
Agnew #2	233,845	123,857	181,946
Morton	307,897	242,055	512,450
Peigh	92,388	19,411	67,725
Huntington	13,606	92,255	171,760
Hillcrest-South	4,542	6,135	19,850
Cuyuna Fee	161,304	18,254	- -
Section 8	54,359	- -	- -
Portsmouth	285,563	37,118	11,045
Spring Valley	175,944	490,955	382,205
Alstead	49,297	68,038	121,457
Martin	- - -		14,736
West Alpena	1,907		3,918
Snyder	9,455	2,755	- - -
Campbell D	18,618	- - -	29,082
Munner	962,977	667,515	984,072
Hunt	76,880	-	- -
South Eddy	513,513	210,588	371,451
Musser	81,670	37,103	34,557
Alpena-East	92,079	66,004	137,624
Gray Reserve	9,863	- -	- -
Gray Annex	25,129	71,863	20,054
Groveland		143,111	604,505
North Uno		293,558	249,358
G-10		140,087	115,982
Mace #2		7,828	- - -
Robert		229,239	360,905
Total Shipments	8,888,951	6,860,074	11,881,252
INLAND STEEL COMPANY			
Armour #1	171,405	42,316	2,135
Armour #2	145,239	117,068	245,687
Morris	335,197	193,261	303,221
Greenwood	83,188	40,458	50,130
Sherwood	471,358	280,543	369,669
Bristol	339,941	215,853	287,115
Total Shipments	1,548,088	896,499	1,257,957
JESSIE H MINING COMPANY			
Jessie	121,902	123,310	125,414
JONES & LAUGHLIN STEEL CORP			
Lind			638,938
Greenway			13,210
Hobart			246
Neville	- - -	- -	123,445
Hill Annex	538,560	276,462	478,406
Hill Annex Reclamation Plant	132,230	- -	121,596
Longyear	258,107	200,300	167,817
Columbia	341,431	185,276	239,114
Messabi Mtn.	81,925	209,782	10,821
Schley	198,280	198,264	192,702
Pettit	282,802	233,864	17,487
Schley Group Stockpiles	64,521		- - -
Tracy	350,723	-	487,819
Nassau	-	117,718	46,048
Leetonia		38,097	
Total Shipments	2,248,579	1,459,763	2,537,649
W. S. MOORE & COMPANY			
Judson	5,668	9,538	66,275
Norman	42,807	10,782	33,429
Mariska	158,882	160,242	157,191
Judson Ext.	14,376	42,625	- -
Mariska Ext.		- - -	25,384
Scranton			10,479
Yaskey			98
Zenith			366,777[1]
Total Shipments	221,733	223,187	659,634
NORTH RANGE MINING COMPANY			
Nahma	- -	- - -	194,518
Champion	123,973	117,225	172,677
Book	32,854	- - -	- - -
Warner	69,535	- -	-
Leonidas	152,747	79,769	- - -
Penokee	103,178	189,559	512,916
Zenith		139,155	366,896[1]
Total Shipments	482,287	525,708	1,247,007
OGLEBAY, NORTON & COMPANY			
Montreal (Montreal Mng Company)	450,282	353,032	967,231
St. James (St. James Mining Co)	177,509	66,967	608,795
Total Shipments	627,791	419,999	1,576,026
OLIVER IRON MINING DIVISION			
Pioneer U. G.	747,997	483,700	831,465
Soudan	161,292	117,157	169,982
Houchleau Grp (incl. Sauntry)	5,055,829	4,123,771	5,893,824
Canton	- - -	160,556	256,997
Pilotac	732,876	618,355	689,438
Gilbert	- - -	349,215	466,936
Hull-Rust Grp	896,912	298,147	922,345
Sherman Grp	3,281,798	2,841,518	4,293,159
Monroe Grp	2,386,602	1,734,100	2,136,286
Pillsbury	- - -	- - -	268,977
Kosmerl Grp	221,621	244,463	326,594
King	117,038	246,132	- - -
Meadow Ext. (Pittsburgh Pacific)	15,636	6,405	- - -
Hanna-Wacootah "B" Stockpile (Pacific Isle)	637	- - -	- - -
Plummer	1,646,836	1,026,625	1,978,048
Emmett Ext.	- - -	- - -	195,923
Arcturus Grp	573,581	780,619	959,301
Midway #2	- - -	- -	3,833
Hopewell	64,060		18,506
Canton (St. James)	148,585	160,556	- - -
Stephens	2,027,711	1,987,951	2,671,619
Iron Range Reserve (Jones & Laughlin)	-	48,804	192,326
Total Shipments	18,239,011	15,087,516	23,500,164
PACIFIC ISLE MINING COMPANY			
Drew-Coxton-Syme	17,002		-
Messabi Mtn. L.O.S.	23,006	22,930	2,462
Iroquois-Wacootah	347,424	493,058	- - -
Iroquois	- -	- -	536,343
Wacootah A			6,520
Wacootah B			12,533
Pacific	65,969		- - -
Alpena L.O.S. P.	31,752		
Chataco	26,799	39,981	
Messabi Mtn. So. Lease	-	- - -	30,979
Wyoming	2,562	205,428	- - -
Mill	696	-	- - -
Ernie	7,754		-
Commodore Group	127,219	5,885	
DM & IR L.O.S.P.	1,046		
Meadow-Meadow Annex	81,143	206,866	-
Fayal L.O.S.	-	-	510
Fayal Intermediate L.O.S.	-	-	445
St. Paul	61,378	3,677	- - -
Sidney	4,865	1,090	- - -
Shiras Trespass		- -	21,117
Wisstar		28,580	3,160
Mangan	43,854	68,013	- - -
Zontelli Fee	134		-
Manuel-West Airport	126,085	67,468	- -
Merritt	15,032	28,117	
South Chandler	742		
Wakefield	15,822		-
Meress	- - -	9,160	
Badger	- -	34,909	
Total Shipments	1,000,264	1,218,326	614,089
PICKANDS MATHER & COMPANY			
Zenith	170,046	- - -	- - -
Embarrass	426,242	282,332	709,074
Albany	175,492	- - -	68,082
Scranton	301,721	161,629	263,677
Mahoning	651,619	335,195	815,746
Hennett	- - -	185,456	310,793
Danube	254,078	244,415	310,052
West Hill	31,314	8,598	- - -
Tioga #2	674,691	358,745	782,834
Rabbitt Lake	- - -	136,895	- - -
Wade	- -	- - -	51,579
Mahnomen	189,341	118,150	133,465
Sagamore	23,498	91,370	29,346
Cary	416,788	303,743	518,098
Newport	341,614	280,319	305,582
Peterson	402,316	295,186	363,891
Geneva	268,604	315,191	435,317
Sunday Lake	265,308	190,530	282,280
Buck Unit	182,584	223,278	264,418
Fortune Lake	2,290	- - -	- - -
Cornell	- - -	6,604	- - -
Volunteer	41,741	110,351	21,600
Total Shipments	4,819,285	7,706,152	5,647,834
PIONEER MINING COMPANY			
Mary Ellen (Conc.)	67,698	94,580	172,007
PITTSBURGH PACIFIC COMPANY			
Wyoming	2,542	205,428	319,622
Chataco	26,799	39,981	40,091
Meadow	15,645	111,653	11,411
Meadow Annex	45,495	95,213	24,672
Messabi Mtn. So. Lease	23,006	22,930	8,852
Sidney	4,865	1,090	4,601
Pearce	- - -	- - -	4,285
Commodore	127,215	5,885	1,720
Fayal #6	- - -	- - -	906
Mangan-Joan	43,854	68,013	69,042
West Airport	74,802	39,289	68,230
Sagamore	- - -	- - -	49,103
Manuel	51,283	28,179	40,908
Merritt L.O.S. P.	15,032	28,117	22,156
No. Yaskey	- - -	- - -	961
Badger		34,909	8,722
Meress		9,160	7,688
Total Shipments	450,340	689,847	702,970
RESERVE MINING COMPANY			
E. W. Davis Works Taconite Pellets	5,082,784	3,603,602	5,446,342
RHODE & FRYBERGER COMPANY			
Boeing	165,812	126,791	122,945
Troy	80,009	49,619	- - -
Pennington	-	47,832	11,688
Carlson-Nelson	- - -	4,744	- - -
Pearsall	95,197	134,174	152,647
Brown	16,386	- - -	- - -
Alworth	- -	15,705	117,660
Total Shipments	357,404	378,865	404,940
SNYDER MINING COMPANY			
Webb-Sellers	252,897	143,167	143,167
Whiteside	136,172	74,486	74,486
Godfrey	156,359	224,390	224,390
Total Shipments	545,428	442,043	442,043
REPUBLIC STEEL CORPORATION			
Susquehanna	- - -	341,435	514,313
Tobin Group	-	76,644	103,861
Total Shipments	- - -	418,079	618,174

1 W. S. Moore Company 50% and North Range Mining Company 50%. North Range is operating agent.

For other United States metal and mineral production tables see:

page 99 Short tons of ore mined and waste stripped at open pit mines
page 101 Underground mine production in short tons from 1955–1960
page 109 State-by-state mineral production

high-grade copper ore reserves into production from deep levels. The company also planned a $6,000,000 program for improving and enlarging the Anaconda Reduction Works. Production of copper by The Anaconda Company raised State output 41 percent to 93,190 tons, compared with 65,911 tons in 1959. The Anaconda-Butte area mines accounted for over 99 percent of the State total. Aluminum production at the Anaconda Aluminum Company's Columbia Falls reduction plant was at 87.5 percent capacity throughout the year.

Webb & Knapp, Inc. was still contemplating the construction of an integrated steel plant at Anaconda. The proposed 350,000-ton annual capacity plant would utilize iron-bearing slag from the Anaconda Reduction Works. A contract was signed during the year with the Bonneville Power Administration for a total of 150,000 kilowatts of firm and interruptible low-cost Federal power. Shipment of 750 tons of slag was made to Strategic-Udy Metallurgical & Chemical Process, Ltd. at Niagara Falls, Ontario, for large-scale testing in a prototype of the plant to be erected at Anaconda.

Zinc output for the state declined 58 percent. The Anaconda Company's zinc-fuming plant at East Helena accounted for a major portion of the state total. The company zinc concentrator at Anaconda, normally the largest producer, had no production until April following the 1959 strike, and was closed in September because of oversupply. Development work was conducted during the year on the Anaconda Black Rock-Elm Orlu low-grade zinc block caving project with the company planning to begin production in 1961.

Lead output experienced a sharp decline of 37 percent from 1959. The decrease was due to curtailed production of lead-bearing zinc ore by The Anaconda Company.

Chromite concentrate output by American Chrome Company from the Mouat mine and mill at Nye increased slightly over 1959. The production was delivered entirely to a nearby stockpile under a government contract that is to be completed in 1961.

Gold production increased 61 percent over 1959. Miscellaneous shipments to The Anaconda Company accounted for a large portion of the total production.

Iron ore from two companies produced 52,380 long tons, five percent more than the 50,081 long ton 1959 output. Magnetite from the Iron Cross property (Ralls & Harris Brothers) near Radersburg was used in manufacturing cement. The Willow Creek mine (Young-Montana Corporation) near Stanford produced magnetite for shipment to Cleveland Cliffs Iron Company, Superior, Wisconsin, and numerous other companies in the Pacific Northwest and Canada.

Silver production from The Anaconda Company accounted for about 80 percent of the State output which was approximately the same as 1959.

Tungsten ore was mined the entire year by Minerals Engineering Company at the Calvert mine near Wise River, Beaverhead County. The ore was trucked to a company mill at Glen for concentrating, and was marketed under contract to an eastern firm.

Barite output was considerably less than in 1959. Baroid Sales Division, National Lead Company, mined and ground the mineral at Greenough, Missoula County. During the year barite was discovered on the west flank of Tobacco River Valley five miles southwest of Eureka, Lincoln County.

Mica production from three operations contributed to a fivefold increase in the quantity shipped to the government purchase depot at Custer, South Dakota, compared with 1959. The bulk of the output came from the Thumper No. 1 mine (Planet Exploration Company) near Gallatin Gateway, Gallatin County. The Sparkle mine near Dillon, and the Merlin mine near Ennis, also shipped mica during the year.

Phosphate rock production was 12 percent higher than 1959. The Bunker Hill Company continued work at the Jack Pine phosphate prospect near Elliston. Development consisted of driving two tunnels and road building. Encouraged by adaptation of the Bureau of Mines mechanical planer to phosphate mining, Montana Phosphate Products Company started work at a mine near Maxville designed specifically for use of the planer.

Nevada

Mineral production up for the year; iron ore exploration active; Yerington expands

Nevada's total mineral production for 1960 amounted to $82,722,000, an increase of $12,500,000 over 1959. Production increases were noted for copper, molybdenum, zinc, uranium, silver, mercury, and iron, while antimony, gold, tungsten, lead, and manganese declined.

The increase in copper, silver, zinc and molybdenum was largely credited to a strike-free year. The drop in recoverable gold was attributed to the closing down of the Round Mountain placer operation late in 1959. Lead shipments, principally as residue from byproduct output of Manganese Incorporated's Clark County plant, were appreciably reduced from 1959 figures. Manganese production from this same operation declined below the 1959 level. Increased iron ore shipments were the result of stepped-up sales with Japan. More tungsten properties were active in 1960 but the total quantity of concentrates sold was lower. The value of uranium ore shipped for out-of-State processing was nearly double that of 1959, and was credited entirely to the Apex mine of the Apex Minerals Corporation at Austin in Lander County. More flasks of mercury were produced in 1960 but the total value increased very slightly due to a lower average unit price that closed some marginal operations.

Exploration for iron ore continued at an accelerated pace during 1960. Utah Construction and Mining Company drilled east of Carson City and discovered an ore body with reserves of several millions of tons. Columbia Geneva division of United States Steel Corporation added many tens of millions of tons of reserves to those already known in the Buena Vista Hills. During the year Columbia Geneva also drilled near Yerington. American Exploration and Mining Company Ltd., a subsidiary of Placer Development Ltd. of Canada, purchased a 50 percent interest in an iron deposit near Lovelock for a reported $2,000,000.

The Anaconda Company started construction on a two-section flotation mill to supplement present oxide leaching facilities at its Yerington copper operation. The $6,000,000 plant will enable the company to treat the considerable amount of sulphide ore now being exposed in the

65 YEARS OF SUCCESSFUL DRILLING FOR FIVE MAJOR INDUSTRIES...

DAM
TUNNEL
HIGHWAY
MINING
EXPLORATION

Boyles Bros. drilling service, involving the newest techniques and modern equipment, is available through eight convenient locations. Contact us about your plans for exploration, shaft sinking, rock breaking, grouting, tunnel driving, mining and quarrying.

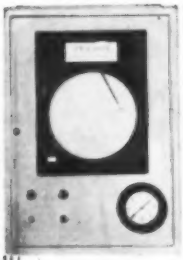
Mine Plant Design and Fabrication

Write for details

Boyles Bros. DRILLING COMPANY

GENERAL OFFICES:
Salt Lake City, Utah.....HUnter 7-7595
BRANCHES:
Phoenix, Arizona....CRestwood 4-5331
Sacramento, California..IVanhoe 3-5221
Denver, Colorado.....ALpine 5-9244
St. Louis, Missouri.....PLateau 2-2544
Reno, Nevada.....FAirview 9-0732
Spokane, Washington...WAlnut 4-2614
Alaska...Contact Salt Lake City Office

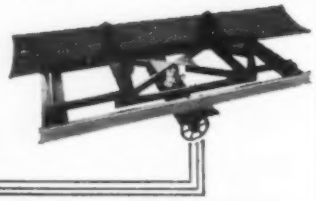
CONVEY WEIGH and CONTROL



your product with one integrated operation

Mechanize with

CON-O-WEIGH



The CON - O - WEIGH system can be installed as a simple weigh-belt mechanism or it can function as a process control system for conveyor-carried bulk materials. Equipped with variable-speed drive and an automatic speed compensation feature, CON - O - WEIGH is ideally adapted to complex feeding, blending and proportioning operations.

Its basic parts are simple . . . weigh section, load cell and control cabinet. Its application broad . . . records accurate running totals on loads of one to 5000 tons per hour.

The weigh bridge space requirements are small . . . can be adapted to existing or new installations.

Write for complete details.

Industrial Physics & Electronics Company

470 So. 10th East DAvis 8-8678

Salt Lake City 2, Utah

open pit. It is scheduled for completion in late 1961, and will have a capacity of 5,000 tons daily.

Bear Creek Mining Company, the exploration subsidiary of Kennecott Copper Corporation, filed on 100 mining claims in Mason Valley, near Yerington, and started drilling for copper in the Lane City area of White Pine County. Newmont Exploration Ltd. drilled for lead, zinc, and copper in the Spruce Mountain district, 50 miles south of Wells, where they have leased the Spruce Mountain mine.

During the year the Ruby Hill Mining Company was organized and will act as operator for five mining firms associated in the development of the Richmond-Eureka Mining Company's lead-zinc-gold mine in Eureka. The $1,000,000 development program is being financed by $250,000 each from Newmont Mining Corporation, Cyprus Mines Corporation, and Richmond-Eureka, with another $250,000 furnished by Hecla Mining Company and Eureka Corporation together. The agreement also provided for raising another $9,000,000 to finance the mining operation, in which case Ruby Hill would own the project with the five companies holding interest in that firm in relation to their investment. Exploration work got underway in September.

The Argentum Mining Company continued expansion of its cyanidation mill on the north side of Columbus Salt Marsh, Esmeralda County, and continued development of low-grade silver ore bodies in the Candelaria district six miles north. In addition to open pitting for silver ore the company milled old Candelaria dumps that contained up to eight ounces of silver per ton.

Development of the Blue Star gold mine, 25 miles north of Carlin, got underway in 1960 with the start of construction on a 300-ton-per-day cyanide mill. The Blue Star project is a joint venture of Combined Productions Associates and The Sierra Nevada Company, both of Salt Lake City; and the MM and S Exploration Company of Nevada.

At the end of the year The Anaconda Company acquired an option on some 103 beryllium claims covering about 2,000 acres in the Mount Washington district 40 miles southwest of Ely. The property is owned by Mt. Wheeler Mines, Inc., and was formerly under option to Beryllium Resources, Inc. Anaconda plans an extensive underground development program.

Mill expansion of the Gabbs plant of Basic, Incorporated, was completed in October and so increased capacity of dead-burned high magnesia refractory clinker to 120,000 tons a year.

In September installation of three-tube, continuous feed, furnace was completed at the Governor mine, 52 miles northeast of Battle Mountain, Elko County, and mercury ores from this mine and other nearby properties were treated.

New Mexico

Uranium and potash set new records; large molybdenum deposit found in Taos County

Total mineral production in 1960 was valued at $656,100,000, a $58,500,000 increase over 1959, or one of the largest dollar gains in the state's history. The value of metals produced, principally copper and uranium, was 36 percent above 1959. The nonmetals group recorded an 11 percent gain.

The 70 percent increase in copper output resulted primarily from a full year's operation at the Chino Mines Division of Kennecott Copper Corporation, compared with reduced output in 1959 due to a labor strike. Installation of a $2,000,000 skip-hoist system to raise ore and waste from the Santa Rita open-pit was started during 1960, and the completion date set for May 1961. The skip hoist is designed to remove 18,000 tons of material daily up an incline of 30° from a depth of 600 feet, and to eliminate almost nine miles of railroad hauling.

Production of uranium ore, chiefly in McKinley and Valencia Counties, increased 15 percent compared with 1959. The grade of ore shipped remained the same as 1959, 0.21 percent (4.2 pounds per ton) uranium oxide. Exploration and development operations continued, and the estimated reserve of uranium ore remained approximately the same as at the close of 1959.

In the Ambrosia Lake district, the economies of shaft sinking by rotary drilling were proven during the year. Near Grants, Kermac Nuclear drilled four 44-inch ventilation shafts totaling 2,862 feet in 10 weeks at a cost of $48.00 a foot including casing.

The Anaconda Company, operator of the Jackpile mine, announced that a new ore body called the Paguate, larger and of higher grade than the Jackpile, had been discovered nearby. The Homestake Mining Company purchased a substantial interest in the Lance Corporation, a wholly-owned subsidiary of Sabre-Pinon Corporation, with uranium mines in McKinley County. Rare Metals Corporation of America began production at its San Mateo mine in McKinley County, and Kerr-McGee Oil Industries completed the installation of a vanadium-oxide recovery unit at its Navajo mill at Shiprock.

Most of the lead and zinc output for the state came from the Hanover mine, operated by the Empire Zinc Division of New Jersey Zinc Company; and the Linchburg mine, operated by lessees, Patten and Galassini.

After a three-year shutdown, the Kearney zinc mine at Hanover and the Peru concentrator at Deming were reactivated during the year as a result of a joint venture agreement between Hydrometals, Inc. (parent company of Peru Mining Company) and American Zinc, Lead and Smelting Company. The Kearney mine was dewatered, all drifts cleaned, and pipelines and powerlines replaced. An extensive underground development program, and a considerable amount of underground and surface diamond drilling was completed.

Molybdenum Corporation of America announced that it had discovered a large molybdenum deposit at its Questa mine in the Red River mining district, Taos County. This resulted from exploration started at the property in 1954. Reserves are estimated at 260,000,000 tons containing about 0.25 percent MoS_2 per ton.

New Mexico Thorium Corporation began rebuilding its thorium mill at Captain which was destroyed by fire late in 1959.

The potash industry of the Carlsbad area boosted output 11 percent over 1959 for a new State record. Mining operations were resumed on the 800-foot level of the International Minerals & Chemical Corporation's potash mine, which had

continued on page 100

SHORT TONS OF ORE MINED AND SHORT TONS OF WASTE STRIPPED AT OPEN PIT MINES IN U.S. IN 1957, 1958, 1959, AND 1960

Company	Mine	1957 Ore Mined	1957 Waste Stripped	1958 Ore Mined	1958 Waste Stripped	1959 Ore Mined	1959 Waste Stripped	1960 Ore Mined	1960 Waste Stripped
American Chrome Co.	Silica Flux					4,230			
	Limestone Flux					2,948			
	Aluminum Flux							195	
American Cyanamid Co.	Orange Park		521,195[4]	905,460[6]	10,487,412[1]	1,051,979[6]	13,555,018[1]	1,293,905[6]	13,984,355[1]
	Sidney		410,342	717,289[6]	8,738,592[1]	784,849[6]	12,784,763[1]	683,704[6]	11,911,178[1]
American Smelting & Refining Company	Mission						1,652,000		29,669,400
	Silver Bell	2,832,600	5,141,480	2,748,600	3,342,060	2,776,400	1,602,610	2,723,200	1,788,470
The Anaconda Company	Alice	95,340	43,038	11,279	1,853,389	297,881	3,395,354	176,059	
	Berkeley	4,891,805	18,197,614	6,923,272	11,721,470	5,529,256	10,865,523	8,772,206	21,035,636
	Yerington	4,004,413	5,491,522	3,996,425	4,044,255	4,320,000	3,883,000	4,474,000	5,500,000
Armour Agricultural Chemical Company	Bartow						743,000		820,000
	Columbia						52,000		52,000
Bagdad Copper Corp.	Bagdad	1,479,034	3,743,300	1,663,611	6,343,597	1,766,634	6,432,008	1,821,402	5,988,379
Basic Incorporated	B. O'Neal	211,000	570,000[1]	153,000	334,000	297,719	403,440		
Colorado Fuel & Iron Corporation	Blowout			129,1474		163,724[4]			
	Comstock			394,426[4]		372,171[4]			
Columbia-Geneva Steel Division, U. S. Steel Corporation	Desert Mound	1,274,000[4]	1,327,000[1]	1,593,371	1,367,000[1]	997,000[4]	1,143,000[1]	1,777,623[4]	1,321,000[1]
	Iron Mountain	1,319,000[4]	1,401,000[1]	1,221,833	1,186,000[1]	795,000[4]	582,000[1]	996,000[4]	1,154,000[1]
Cummings-Roberts	Crystal Mt.							36,387	
Dawn Mining Company	Midnite			191,265		130,506	407,899	116,825	462,086
	Silver Buckle							28,731	139,003
Duval Sulphur & Potash Company	Esperanza		410,342		6,217,886	3,216,383	7,909,412	4,366,856	9,648,961
W. R. Grace Co., Davison Chemical Division	Bonny Lake	1,806,000	4,010,900[1]	1,222,600	2,734,500[1]	1,015,180[2]	2,509,200[1]	2,002,690[2]	5,732,700[1]
	Clark-James							135,930[2]	234,500[1]
	Pauway-Standard	1,979,800	3,219,600[1]	578,000[2]		2,417,090[2]	4,697,900[1]	1,008,780[2]	1,874,500[1]
Gunnison Mining Co.	School Section					4,968			
	Thornburg #1								2,032
The Hanna Mining Co	Nickel Mtn.	1,016,596		1,000,100		1,026,913		1,103,953	
Humphreys Mining Co.	Skinner					2,172,000	2,520,000	2,412,000	3,072,000
Inspiration Consolidated Copper Co.	Inspiration	4,456,378	8,156,872	4,621,091	5,462,587	5,378,848	3,993,262	5,314,770	4,105,835
Jones & Laughlin Steel Corp	Benson	5,110,679[4]	4,424,289[4]	3,964,544[7]	2,824,541[3]	3,419,966[7]	2,420,167[3]		
Kaiser Steel Corp.	Eagle Mtn	2,635,000[6]	6,491,000	3,109,859	7,323,280	3,454,000	9,820,000	3,213,000	12,476,000
Kennecott Copper Corp. Chino Mines Div.	Chino	7,410,927	13,256,722	5,552,713	10,578,498	4,492,287	8,313,840	7,338,378	16,584,218
Nevada Mines Div.	Liberty	2,710,093	1,177,977	3,013,234	8,384,545	3,472,813	8,726,254	7,355,000	16,752,000
	Tripp			42,109		38,471			
	Veteran	1,638,249	10,409,322	2,338,030	2,892,335	887,758	118,059		
Ray Mines Div.	Ray	4,991,608	11,038,562	4,311,334	9,912,120	3,036,175	7,419,324	6,616,771	14,467,527
Utah Copper Div.	Bingham	30,919,900	32,300,817	24,086,800	41,094,400	19,673,100	50,928,000	28,060,000	59,537,000
Lone Star Steel Co.	Lone Star	3,266,276[6]	549,195[1]	1,753,462[6]	260,339[1]	3,577,555[6]	733,762[1]	1,980,119[6]	422,924[1]
Lucky Mc Uranium Div., Utah Construction & Mining Company	Lucky Mc	32,081	1,911,683	324,465	5,296,955	293,648	6,452,733[1]	216,915	4,352,204[1]
Manganese, Inc.	A & B					3,795		146,248	389,520[8]
	Hulin					77,279	919,208[8]	8,436	
McFarland & Hullinger	Blue Bell					3,293			
	Elgin					5,114			
Miami Copper Company	Copper Cities	3,482,482	3,037,708	2,768,390	2,103,268	3,060,575	1,809,438	3,058,372	1,666,149
Montana Phosphate Products Company	Anderson	117,000	340,000	118,817	348,862[5]	120,000	345,000	120,000	355,000
Molybdenum Corp of Amer	Mountain Pass					20,030	5,000	19,760	10,000
Mountain Copper Co. of California	Brick Flats			93,000	880,000	104,000	1,050,000		
Nevada Iron Ore Co.	Thomas			30,000	60,000	30,000	60,000		
Phelps Dodge Corp.	Lavender	4,440,768	5,968,164	4,027,522	4,423,439	3,169,701	4,772,791	4,245,298	11,571,946
	Morenci	14,767,611	32,608,512	13,039,187	26,899,850	10,513,023	18,930,001	14,499,830	21,214,016
	Ajo	1,813,134	14,014,755	7,711,440	13,691,784	9,823,514	15,059,850	9,065,610	14,654,907
Pima Mining Co.	Pima	1,094,559[6]	3,052,201[2]	1,098,742[6]	3,120,835[1]	1,200,606[6]	2,618,804[1]	1,327,473[6]	4,027,316[1]
Rare Metals Corp. of America	Idaho Almaden					55,231	12,630[1]	55,841	35,752
Reserve Mining Co.	Peter Mitchell	15,512,478[4]		13,150,000[4]	1,290,000[1]	10,215,317[4]	907,968[1]	14,711,220[4]	1,512,461[1]
Reynolds Mining Co.	Saline County	135,230	789,021[1]	575,189	753,675	824,096	1,765,399[1]	997,604	2,723,284[1]
Round Mtn. Gold Dredging Corp.	Round Mtn.			2,198,809	N.A.	2,895,462	1,076,675		
J. R. Simplot Co. Minerals & Chemicals Division	Conda			N.A.	N.A.	165,000	590,000[1]	320,000	900,000[1]
	Gay	482,648	1,321,850[1]	1,045,200	1,893,000[1]	1,150,000	2,700,000[1]	950,000	2,300,000[1]
	Sun Valley Barite	48,957	44,412			25,000	25,000[1]		
Smith-Douglass Co.	Tenoroc	3,804,000	4,966,283	3,350,000	6,090,000[1]	3,430,000[2]	5,484,000[1]	3,330,000[2]	6,163,200[1]
Trout Mining Co.	Tree Top							7,500	
United Perlite Corp.	United Perlite					6,716			
Utah Construction & Mining Company	Iron Springs					600,000	1,300,000[1]	700,000	1,000,000[1]
Vitro Minerals Corp.	Jay						104,460[1]		1,695,430[1]
	John					88,260	919,600[1]	128,840	521,000[1]

1. Cubic yards. 2. Long tons. 3. Gross tons rock. 4. Gross tons. 5. Cubic yards surface. 6. Net tons. 7. Gross tons crude. 8. Wet. N.A. Not Available

The "PARALINE PROCESS"

Engineered Protection

against
corrosion and abrasion

• **PARALINE RD**

Proven over 14 years as the best available plasticized polyvinyl chloride. Superior seamless linings (bonded to metal) tanks — pipe — other equipment

• **PARALINE FG**

Isophthalic polyester and epoxy laminates—greater temperature and chemical resistance. Tanks, ductwork, etc.

• **PARALINE SL**

Plasticized polyvinyl chloride in sheet form — for "in place" lining of tanks and other equipment which are too large for transporting.

• **PARALINE AR**

Newest member of the Paraline family — Greater abrasion and chemical resistance and harder surface.

We welcome the opportunity to demonstrate the superior quality of our Engineered protective linings and coatings.

PLACE YOUR CONFIDENCE IN THE
PARALINE PROCESS

BARBER-WEBB
3864 Santa Fe Ave., Los Angeles 58
LU 1-9126

Phoenix
Salt Lake City San Francisco

Reg. T. M. Barber-Webb

been idle since 1948. The company installed a new type of shuttle car on the 900-foot level. Southwest Potash Corporation announced a $3,000,000 expansion program.

Work continued on two shafts at a new production site for Duval Sulphur & Potash Company. A 14-foot hoisting shaft and a 9-foot escapeway shaft were nearing completion by the end of the year. The two 1,000-foot concrete-lined shafts will develop two sources of sylvite ore, and open new ore reserves discovered by surface drilling.

In December Johns-Manville opened its new perlite mill at No Agua that has a rated capacity of 150,000 tons of processed perlite annually. Crude ore is coming from the Seven Hills of Taos mine west of the Sangre de Cristo Mountains in Taos County.

Beryl discoveries at the Harding mine in Taos County were watched with interest during the year, and construction of a flotation mill is being considered.

Oregon

Nickel mining was steady; gold and silver output continued low; mercury dipped

During 1960 metal mining was mostly inactive and uranium output decreased drastically. By the end of the year the Hanna nickel operations in Douglas County, and the Bretz mercury mine in Malheur County were the only sizable producers.

The Hanna nickel mine and smelter near Riddle operated at capacity levels in 1960. Nickel ore output from the open-pit mine totaled 1,100,000 tons which was transported by aerial tramway from the mine to the smelter. The tramway was damaged in an accident in September, and was shut down for several weeks during which time ore was delivered to the smelter by Diesel trucks. Output at the smelter was 22,228,720 pounds of nickel contained in ferronickel.

Production of mercury was mostly from the Bretz mine (Arentz Mining Venture), and the Bonanza mine (Bonanza Mine & Oil Corporation) in Douglas County which shut down October 1. The Werdenhoff Mining Company developed its Mother Lode mine in Crook County and installed new mill equipment.

The White King uranium mine in Lake County was idle most of the year after producing substantially in 1959. However, a contract was given to the Isbell Construction Company of Reno, Nevada, for stripping some 6,500,000 cubic yards of overburden so that open pit operations of uranium ore can begin in 1961. During the later part of 1960 some uranium production was recorded from the Lucky Lass claims near the White King.

About 35 placer and lode mines produced gold during the year, but the total metal recovered was very small. Placer mining, mainly in Josephine County, supplied the principal share of the output. Lode gold was recovered largely from the Buffalo mine and the Standard mine in Grant County. During the summer, one shipment of concentrate was made from each of these operations.

In April, Harvey Aluminum, Inc. announced it would expand the annual capacity of its primary aluminum plant at The Dalles from 60,000 tons to 75,000. Fabricating facilities consisting of billet casting and wire rod equipment were also planned.

South Dakota

Homestake starts $1,500,000 expansion program for deep level mining

Gold and silver production for the year dropped 5 and 11 percent, respectively, because of the continued suspension of operations of the Bald Mountain Mining Company at Trojan, and the extensive development program at the Homestake Mining Company at Lead that resulted in a lower output. Homestake announced plans in September to spend $1,500,000 through 1962 to add facilities to the mine at Lead that would permit mining below the 4,850 level, and expand daily capacity of the mill from 4,800 to 5,600 tons.

A contract with the Lithium Corporation of America, Inc. was approved by the Office of Minerals Exploration (OME) for the exploration of deposits of beryl and columbium-tantalum at the Black Diamond claim in Custer County. Total amount of the contract was $26,640, with participation by the Federal Government limited to 50 percent. The Keystone Mill Division of Northwest Defense Materials started a beryllium flotation circuit in its Keystone mill that processes 100 tons of ore a day using a new recovery method.

Uranium ore production from mines in Fall River and Custer Counties declined 27 percent as a number of the deposits approached exhaustion. The 400-ton-a-day processing plant of Susquehanna Western, Inc. at Edgemont operated the entire year, though nearly half of the crude ore processed was from deposits in Wyoming. A unit for the recovery of vanadium oxide was added to the plant and operations began in September.

The Pittsburg Pacific Company of Hibbing, Minnesota, mined several hundred tons of manganese-bearing material from a deposit near Fort Thompson for test purposes.

Tennessee

Continues to lead nation in zinc production with new records set for year

A record production of zinc, copper, and pyrite highlighted the mineral industry of Tennesee in 1960. Copper production set a new record, increasing 13 percent over the record of 1959. Production of zinc again set new records, increasing 1 percent over 1959, although strikes hampered production during the year.

Continued exploration and expansion of zinc facilities dominated the picture. In June the Tri-State Zinc Company announced plans to develop a new zinc

Short Tons Mined at U.S. Underground Mines 1955-1960

Company	Mine	1955	1956	1957	1958	1959	1960
Alan Wood Steel Company	Scrub Oaks					298,740	278,647
	Washington					123,834	98,935
Alaska Mines & Minerals, Inc.	Red Devil					10,069	10,795
Allied Chemical Corp, General Chemical Division	Gossan					180,000	150,000
Aluminum Corp of America	Fluorspar				63,220	67,373	
American Chrome Company	Mouat		234,346	251,323	250,166	219,144	214,341
American Smelting & Refining Co.	Galena	56,489[3]	87,925	123,129	119,822	117,785	48,696
	Jack Waite	6,478[3]	7,253	9,689	9,616	13,248	5,178
	Page	76,831[3]	109,586	128,751	117,411	111,405	46,369
American Zinc Company of Tennessee	Athletic	25,350	17,384				
	Coy			8,384	31,353	92,688	101,493
	Grasselli	162,406	182,145	183,934			75,665
	Mascot #2	466,721	487,227	488,302	448,827	489,014	482,079
	No. Friends Sta.	119,876	106,301	114,405	77,169	76,492	47,954
	Young	16,920	200,311	325,225	444,777	569,563	701,776
American Zinc, Lead & Smelting Co.	Grandview	194,999	209,089	228,352	231,515	236,273	222,529
	Mineral Rights						9,534
	Nellie B Division	971,175	361,872	148,879			
	Piquette Joint Venture	53,836	95,511	89,227		8,609	49,230
	Vinegar Hill Division	45,912	145,231	91,252		6,082	188,836
The Anaconda Company	Anselmo					322,347	
	Badger-Elm Orlu-Black Rock						
	Emma					2,334	25,000
	Kelley					193,045	
	Mountain Con			4,325,263	3,034,952	2,459,924	3,025,727
	Steward					334,820	447,707
Appalachian Sulphides, Inc.	Ore Knob					19,817	101,680
B S & K Mining Company	Atlas					233,696	289,942
Banner Mining Company	Daisy					16,940	18,670
	Palo Verde	60,097	76,002	90,117	101,033	72,432	48,872
Beaver Mesa Uranium, Inc.	Beaver Mesa Mines						6,852
Bethlehem Cornwall Corp	Cornwall					71,567	66,588
The Bunker Hill Company	Bunker Hill	1,737,610[1]	1,381,281[1]	1,596,088[1]	1,568,514[1]	1,168,468[1]	
	Crescent	528,833	531,334	512,934	352,575	450,545	165,041[9]
Calumet & Hecla, Inc. Uranium Division	Calumet Division	10,681	2,411	12,032	21,038	24,934	14,302[9]
Camp Bird Colorado, Inc	Marquez	1,406,671	2,060,849	1,731,385	1,598,173	1,564,355	1,549,110
Clayton Silver Mines	Camp Bird				81,225	139,074	134,431
Climax Molybdenum Company, Division of American Metal Climax, Incorporated	Mine						14,650
	Climax	9,227,700	9,929,000	10,550,000	6,363,620	26,279	34,943
Colorado Fuel & Iron Corp.	Sunrise	838,692[1]	725,496[1]	786,548[1]	498,521[6]	9,090,000	11,680,000
Cordero Mining Company	Cordero			35,156	35,714	495,428	474,796
Cyprus Mines Corporation	Old Dick					45,845	45,998
Day Mines, Incorporated	Coeur d'Alene District				55,504	76,111	80,940
Denver-Golden Corp.	Schwartzwalder				9,771	45,753	41,998
Dulaney Mining Company	Mine					17,883[4]	18,245[4]
The Eagle-Picher Company	Birkett					24,148[7]	17,444[7]
	Graham		200,000	207,427	430,758	68,311	93,694
	Linden					301,925	209,957
	O'Rourke						39,500
	Shullsburg		363,300	304,380	364,305	381,173	103,972
Four Corners Exploration Co.	Dog				13,357	23,811	301,917
	Hogan					29,384	13,002
Golden Cycle Corporation	Ajax				28,486	34,994	51,684
	United Gold Mines -Deadwood					9,784	38,304
	Uranium Division, Atkinson Mesa						6,985
Gunnison Mining Company	East				20,059	20,421	20,791
	Last Chance					495	8,662
	School Section					2,907	4,671
	Thornburg #1 & West						2,710
	Thornburg #2					91,440	116,992
Haystack Mtn. Development Co.	Section 25 Shaft					6,790	15,135
Hecla Mining Co.	Polaris					42,692	44,666
	Radon		50,806	50,304	48,393	29,422	27,133
	Star[2]	3,506	53,605	62,142	68,399	69,089	67,095
Hidden Splendor Mining Company	Columbia	216,471	189,821	206,385	184,552	218,239	245,326
	Dysart #1			3,592	52,504	49,870	
	Far West Shaft		18,391	131,000	244,272	365,553	
	Ike Shaft				147,618	152,203	
	Radium King			27,915	65,953	60,825	
Homestake Mining Company	Hauber				36,366	39,297	
	Homestake	1,550,116	1,627,719	1,659,705	1,725,081	56,670	101,004
	La Sal					1,746,244	1,767,135
	North Alice					39,000	45,300
Homestake-New Mexico Partners	Section 32				43,124	76,800	94,200
Homestake-Sapin Partners	Section 15					65,000	51,000
	Section 23					206,637	156,798
	Section 25					130,746	186,114
Idarado Mining Company	Idarado	274,550	480,000	457,850	382,100	31,640	107,975
Intermountain Chemical Company	Westvaco		596,753	672,000	618,000	369,050	432,750
Jaquays Mining Corporation	Chrysotile					805,000	935,000
	Regal					3,200	20,839
Kermac Nuclear Fuels Corp.	Ambrosia Lake Mines (6)				119,000	24,830	21,160
Lovitt Mining Company, Inc.	Lovitt			68,909	62,972	479,000	
Lucky Friday Silver-Lead Mines Co.	Lucky Friday					31,810	
Magma Copper Company	Magma	458,488	453,683	442,134	391,084	69,428	133,724
Manganese, Incorporated	Hulin					276,387	
McFarland & Hullinger	Johnson Camp						3,519
	San Xavier				25,559	14,884	
Midwest Ore Company	Iron Mountain			438,335	413,981	12,047	
Minerva Company (Fluorspar Div.)	Crystal	9,746	93,320	85,548	94,252	355,663	549,420
	Jefferson (incl. Fairbairn)					7,671	28,356
						5,662	12,206

(continued on next page)

Company	Mine	1955	1956	1957	1958	1959	1960
	Minerva #1	70,651	66,771	88,296	86,021	48,880	72,450
	Victory					17,720	34,164
Montana Phosphate Products Co.	Anderson	294,971	170,689	172,000	184,647	186,000	201,000
	Luke					69,000	82,000
National Lead Company,							
St. Louis Smelting & Refining Div.	Madison	293,782	355,782	354,764	231,565	282,878	262,390
New Idria Mining & Chemical Company							
Uranium Division	Johnnie Mae Group				488	1,962	
	Pack Rat Group			6,445	14,261	13,481	
Quicksilver Division	New Idria	36,236	22,517	37,102	43,941	41,172	
New Park Mining Company	Mayflower			60,167	43,802[5]	39,892	
Ozark-Mahoning Company	Ozark-Mahoning					104,161	108,523
Pend Oreille Mines & Metals Company	Pend Oreille	503,391	587,891	757,197	607,695	619,779	727,759
Phelps Dodge Corporation	Copper Queen	546,001	632,088	630,068	499,257	373,395	509,668
Pinnacle Exploration, Incorporated	Pitch					8,460	26,100
Rare Metals Corp. of America	San Mateo						4,077
Reynolds Mining Corporation	Pulaski County						7,536
	Saline County	180,181	151,874	162,943	121,704	163,190	185,820
St. Joseph Lead Company	Balmat	539,530	548,167	551,299	469,652	367,279	588,535
	Edwards		121,788	121,648	104,694	79,687	124,724
	Indian Creek					589,185	608,972
	Lead Belt Area					4,701,938	4,796,744*
	Viburnum						230,005
San Manuel Copper Corporation	San Manuel	459,726	5,496,328	8,825,130	11,486,300	7,595,867[8]	12,261,220
See Tee Mining Corporation	Buckey					14,000	7,000
	Mesa Top-Malpais					27,000	42,000
Shattuck Denn Mining Corporation	Iron King					299,981	304,485
Sonoma Quicksilver Mines, Inc.	Mt. Jackson					30,386	40,224
Standard Metals Corporation	Big Buck	96,538	133,259	94,334	100,748	128,979	139,400
	Micawber					5,000	5,254
	Mountain Monarch						1,020
	Shenandoah						37,972
Sunshine Mining Company	Sunshine	225,883	200,028	206,385	231,964	234,548	232,342
Tri-State Zinc, Incorporated	Bowers-Campbell & Gray					479,938	492,047
Trout Mining Company	Algonquin					8,000	36,000
Tungsten Mining Corporation	Hamme						172,815
U. S. Steel Corp., Tennessee Coal							
& Iron Division	Zinc					341,935	387,453
United Park City Mines Company	Mine				106,382	107,619	108,874
U. S. Pipe & Foundry	Sloss				153,110	67,658	
Utex Exploration Company	Mi Vida			102,556	92,221	73,949	
Western Gold & Uranium, Inc.	Orphan			4,013	12,228[7]	26,417[7]	
White Pine Copper Company	White Pine				4,229,611	3,967,751	3,868,010
Woodward Iron Company	Pyne			768,457	791,427[6]	917,718[6]	
Yuba Development Corporation	Hideout					24,199	25,361
	Lessee					9,678	12,251

1. Net tons. 2. Mine owned by Bunker Hill Company. 3. Production cut by five months strike. 4. Wet. 5. Mine placed on lease October, 1957. 6. Gross tons. 7. Dry tons. 8. Production down due to August-December 1959 strike. 9. Production cut by seven and one/half months strike. *Total production of the Southeast Missouri Division mines of the St. Joseph Lead Company for the years 1955-1959 is as follows: 1955, 4,994,221, 1956, 5,972,884; 1957, 6,038,785, 1958, 5,490,653, 1959, 5,291,123.

Be sure of a uniform product!

1. Sodium Chlorate is an effective oxidizing agent.
2. It is more economical to use than other oxidants.
3. It forms a true concentrated solution permitting simple handling and metering.
4. The 55 gallon, 18 gauge full open head shipping drums can be used to ship yellow cake.

Pennsalt
SODIUM CHLORATE
in acid leaching of uranium ore

PENNSALT technical engineers are at your service. Write for Technical Bulletins Nos. C-5001, C-5005.

INDUSTRIAL CHEMICALS DIVISION — WEST
PENNSALT CHEMICALS CORPORATION
TACOMA 1, WASHINGTON
OFFICES AND PLANTS
Los Angeles, Calif. Philadelphia, Pa. Portland, Ore.
Salt Lake City, Utah (ELgin 9-9353) Vancouver, B.C. (CRestwood 8-8441)

Pennsalt Chemicals
ESTABLISHED 1850

mine near New Market on land controlled by American Zinc, Lead and Smelting Company. Reserves are said to be 17,000,000 tons of approximately 3.5 percent zinc ore. A 3,600-ton-per-day concentrating plant will be built by Tri-State on American Zinc's Grasselli mine property, and when the $4,000,000 joint project is completed in 1961, production is expected to be 35,000 to 40,000 tons of zinc concentrates a year. At the end of 1960 Tri-State had five diamond drills operating double shift to confirm tonnage and grade of ore reserves.

American Zinc Company of Tennessee, a subsidiary of American Zinc, Lead and Smelting Company, started shaft sinking at its new Immel zinc mine near Strawberry Plains. The company has proved and indicated an area that will produce approximately 1,000,000 tons of 60 percent zinc concentrates.

The Grasselli zinc mine at New Market and the New Friend Station zinc mine in Jefferson County, both operated by the American Zinc Company, were shut down during 1960.

The Tennessee Copper Company continued development of the Cherokee-School Property copper ore body. By the end of the year shaft sinking was almost completed to the planned depth at the 14 level, about 1,000 feet below the surface. Plans were announced for the installation of a fluo-solids roaster to be built at the Copperhill smelter for treatment of copper concentrates.

The Foote Mineral Company announced plans to build a $6,000,000 electrolytic manganese plant near Johnsonville. Construction was started in September and the first unit of the 20,000,000 pound-per-year plant is scheduled to begin operations in late 1961.

Hematite iron ore averaging 52 percent Fe was mined at a new mine in Union County, 50 miles from Rockwood. It was processed in Rockwood in a blast furnace of the Tennessee Products and Chemical Corporation.

Texas

First uranium plant under construction; talc production continues to expand

While iron ore, magnesium, mercury, and uranium were the only metals mined in Texas in 1960, and their combined value was small compared with the total mineral value of the State, there were 18 metallurgical plants in the State which processed ores and other materials mined in other states and in foreign countries.

International Minerals & Chemical Corporation started operations of their $500,000 barite processing plant in November. The highly automated plant in Houston will grind and bag barite from ore acquired from Missouri, and imported from Mexico, Peru, and the Mediterranean area. A 100-ton-per-day mill to process barite ore from the Apache Mountain lease was built near Van Horn by Continental Minerals Company.

Susquehanna Western, Inc., a subsidiary of the Susquehanna Corporation, announced that it will build Texas' first uranium processing plant at Falls City. The $2,000,000 plant will have a rated capacity of 200 tons of ore per day, and will use a complex metallurgical recovery system. A uranium purchase contract involving the construction and operation has been signed with the Atomic Energy Commission.

A $30,000,000 direct iron ore reduction plant that would use marginal east Texas iron ores to produce a sponge iron or semi-steel was planned for the Palestine area by Sovereign Steel of Texas.

A $3,500,000 gypsum products plant will be built on the Houston Ship Channel by Kaiser Gypsum Company.

Frasch sulphur mining operations at Clemens Dome in Brazoria County were terminated by Jefferson Lake Sulphur Company.

Talc production continued to expand in the Allamoore District as deposits were further developed by the five talc producers. Pioneer Talc Company continued to operate its new grinding mill. Several other mining interests acquired mineral leases and engaged in exploration. Talc production for the year was 73,900 short tons as against 60,945 short tons for 1959.

Utah

Beryl and lead discoveries plus new mining and milling projects highlight the year

New discoveries and expansions highlighted the mining industry in 1960, as well as increased production of copper, iron, gold, silver, and molybdenum.

Most exciting of the new discoveries was the finding of beryllium deposits of commercial grade in the Topaz-Spor Mountain area in the west-central part of the State. Vitro Minerals Corporation, Beryllium Resources Incorporated, Combined Metals Reduction Company, and others were actively engaged in exploration programs in the area.

Marvel Mining Company announced the discovery of a high-grade lead-silver oxide ore in the Clifton mining district in western Tooele County, and made shipments to the Tooele smelter of International Smelting and Refining Company.

United Park City Mines Company completed a 400-foot incline winze to develop a silver-bearing lead-zinc ore body in the Humbug formation in its United Park City mines. New Park Mining Company continued its reported $750,000 exploration and development program for silver-bearing lead-zinc ore at its Park City properties. It was reported by company officials that ore with a greater value was developed, and the ore reserve was increased beyond the rate of withdrawal during the year.

In August an excavation project scheduled for completion in nine months was begun by Kennecott Copper Corporation at its Utah Copper Division open-pit copper mine at Bingham Canyon. The project involves a spiral approach to the 5490 tunnel which is 150 feet below the present bottom of the pit, a method considered more feasible than the previous time-consuming method of establishing new levels 50 feet below each other. Once the spiral is connected with the tunnel, the ore from the pit will be hauled downhill and out the new tunnel rather than uphill to the 5,840-foot level tunnel presently in use.

Operational responsibilities at the Tintic Unit of the Bear Creek Mining Company in Tooele County were transferred to the parent company, Kennecott Copper Corporation, in July, and marked the transition of the project from exploration

the truck that does the most for you is your 4-WHEEL DRIVE with WARN®

HUBS

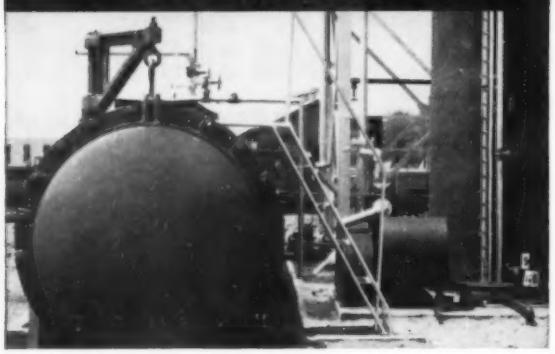
THEY MAKE 2 TRUCKS OUT OF 1

With Warn Hubs, 4-wheel drives do double-duty. The hubs stop front end drag in 2-wheel drive for fast, easy, quiet and economical highway use. They save gears, engine, tire wear and gas; improve pep, speed, handling ease in 2-wheel drive. But you still have 4-wheel drive as usual—automatically, with Warn Lock-O-Matics; manually with Warn Locking Hubs. They are as dependable as the vehicle; normally last as long or longer. Hundreds of thousands in use. Ask *your* dealer for Warn Hubs. They make sense!

MODELS FOR ALL 4-WHEEL DRIVES

WARN MFG. CO., INC.
Riverton Box 6064-MW
Seattle 88, Wash.

YOUR OWN TREATING PLANT



Some leading mining companies, who have high volume timber requirements, have advantageously installed their own Wolmanized timber treating plants.

KOPPERS LICENSED TREATING PLANT

Centrally located Koppers licensed plants have been installed to serve the combined treated timber requirements of several mines in one district.

KOPPERS-OWNED TREATING PLANT

Located throughout the United States, Koppers own pressure-treating plants can provide fast, dependable delivery of decay-resistant Wolmanized mine timbers.

Three Sources for LONG-LASTING, DECAY-RESISTANT Wolmanized® Mine Timber

...Which One Would Cost YOU the Least?

Koppers can help you find the answer!

Based on location and timber requirements, the best source of supply for one mine might not be the best one for you. Koppers qualified and experienced technical staff is available to study your timber requirements and advise you. If the most feasible solution is the construction of your own plant, Koppers vast experience in wood preservation includes plant design and engineering tailored to fit the specific needs of the individual operation.

Far-sighted mine operators specify Wolmanized pressure-treated timber to prevent premature loss of strength due to decay. Service records, kept over a period of more than thirty years, prove the durability of Wolmanized mine timbers. In addition to contributing to increased mine safety, the use of Wolmanized mine timbers eliminates costly shutdowns resulting from early failure of untreated timber.

For an individualized study and economic analysis of your timber requirements, without obligation, write, wire or phone:

W-98

Wolmanized®

PRESSURE-TREATED TIMBER

Wolman Preservative Dept., Koppers Company, Inc.
750 Koppers Building, Pittsburgh 19, Penna.

to development stage. Centennial Development Company, which has conducted the bulk of exploration work on this property, was retained by Kennecott to sink a 440-foot incline winze 1,000 feet west of the Burgin shaft. Significant discoveries of high-grade silver-bearing lead-zinc ore on this property have been reported.

The Anaconda Company obtained an option from McFarland and Hullinger, mine contractors, on the Scranton lead-zinc mine eight miles north of Eureka, and planned extensive geological mapping and sampling on the property.

Majestic Oil and Mining Company announced plans to develop the Bawana copper deposit near Milford as an open-pit mine, and to renovate a 350-ton-per-day mill to treat the ore.

Cerro Corporation (formerly Cerro de Pasco Corporation), in a joint venture with Chief Consolidated Mining Company and Armet Corporation, completed an initial exploration program for silver-bearing lead ore at the Holt mine near Enterprise in Iron County. No announcement was made on future plans.

Index-Daley Mines Company announced that it will drive a 1,300-foot exploration tunnel at the Creole mine near Minersville. Heinecke Brothers will continue to produce silver-bearing lead-zinc ore from the upper levels of the mine and operate the 100-ton-per-day mill on the property.

Uranium ore production declined 12 percent compared with 1959. The primary causes of the decline were the approaching exhaustion of some ore bodies (particularly in the vicinity of Monticello), the closing of the government-owned processing plant at Monticello, and the adjustment of operating schedules. Mills at Mexican Hat, Moab, and Salt Lake City operated throughout the year. Some uranium ores, particularly those in San Juan County, contained significant quantities of vanadium oxide which was recovered at mills in southwestern Colorado and northwestern New Mexico.

An official of the Minerals Engineering Company announced that Mineral Engineering and Susquehanna Western, Incorporated, had purchased the Howe Sound Company's cobalt refinery 20 miles west of Salt Lake City. The plant will be converted to produce vanadium pentoxide for atomic energy uses, in alloy steel, and in vehicle smog control devices.

San Francisco Chemical Company began construction in April of a phosphate plant near Vernal. Unit No. 1 of the concentrating plant was operating at the end of the year, and consists of a 250-ton-per-hour crushing plant plus a grinding, desliming, flotation, filtration, and drying plant. The operation will eventually have a concentrate capacity of 200,000 tons a year.

Delhi-Taylor Oil Corporation announced a joint venture agreement with Texas Gulf Sulphur Company for development of a large potash deposit in the Cane Creek region south of Moab.

Production of gilsonite at mines in Uintah County increased 24 percent over 1959. American Gilsonite Company, the major operator, continued improvement of operations at the Bonanza mine, and introduced a radically new high-pressure hydraulic mining method that virtually eliminates need for all underground timbering.

Washington

Production of gold, silver, uranium, and zinc increased substantially during the year

The value of mineral production increased during 1960 with five mines supplying nearly all the metal production. These were the Knob Hill mine in Ferry County (gold-silver), the Gold King mine in Chelan County (gold), Pend Oreille and Grandview mines in Pend Oreille County (lead-zinc), and the Midnite mine in Stevens County (uranium).

Mine production of gold and silver gained with the Gold King and Knob Hill mines supplying nearly all of the state output, although some silver was recovered as a byproduct of lead-zinc mining.

Low metal demand and a lengthy strike at the Kellogg, Idaho, smelter caused a decline in lead production in the state. Output came from the Metaline district where Pend Oreille Mines & Metals Company operated its mine and mill, and the American Zinc, Lead & Smelting Company operated its Grandview mine and mill. A new lower level was in production at the Grandview so that ore was mined from a total of three levels. Clayloon Uranium Company completed a small jig mill at Leadpoint, Stevens County, to process lead-zinc ore from the nearby Lead Trust and Lead King mines.

Due to the higher price the production of zinc was generally emphasized throughout the Metaline district where production came from the Pend Oreille and Grandview mines. During the last half of 1960, concentrate was shipped to the zinc plant at Anaconda, Montana, during the strike of the Bunker Hill plant at Kellogg. Late in the year, Goldfield Consolidated Mines Company began to develop its Anderson zinc mine in northern Stevens County. This mine, formerly an open-pit operation which was shut down in 1952, was to be readied for mechanized, underground production to exploit ore bodies discovered by diamond drilling during the last three years. A 15- by 15-foot heading was being driven from the bottom of the 100-foot deep open pit.

The largest uranium producer in the

CARQUAKE ORE CAR SHAKEOUT

Completely mobile . . . completely self-contained . . . the fastest, most economical way to empty cars. One man operation. All hydraulic controls.

Proven over 8 years in the Lake Superior mining area. Custom-built to fit your cars. For details . . .

write

PLANT-DOUGLASS

PO Box 155 Duluth 1, Minnesota

Sala Safety Block

Developed by Sala Maskinfabriks AB in cooperation with the largest mining companies in Sweden, the SALA SAFETY BLOCK entirely eliminates danger from falls and is now used by safety-minded builders and contractors all over the world.

This unique block is completely self-contained. It holds 16 feet of steel wire rope mounted on a spring loaded drum. With normal movement the rope pulls out and winds up automatically, keeping the rope taut and giving the user freedom with absolute safety.

DEALERSHIPS DESIRED

MACHINERY CENTER, INC.

1201 So. 6th West, HU 4-7601, P.O. Box 964
Salt Lake City 10, Utah

SKOOKUM

COMPLETE LINE OF

MINING BLOCKS

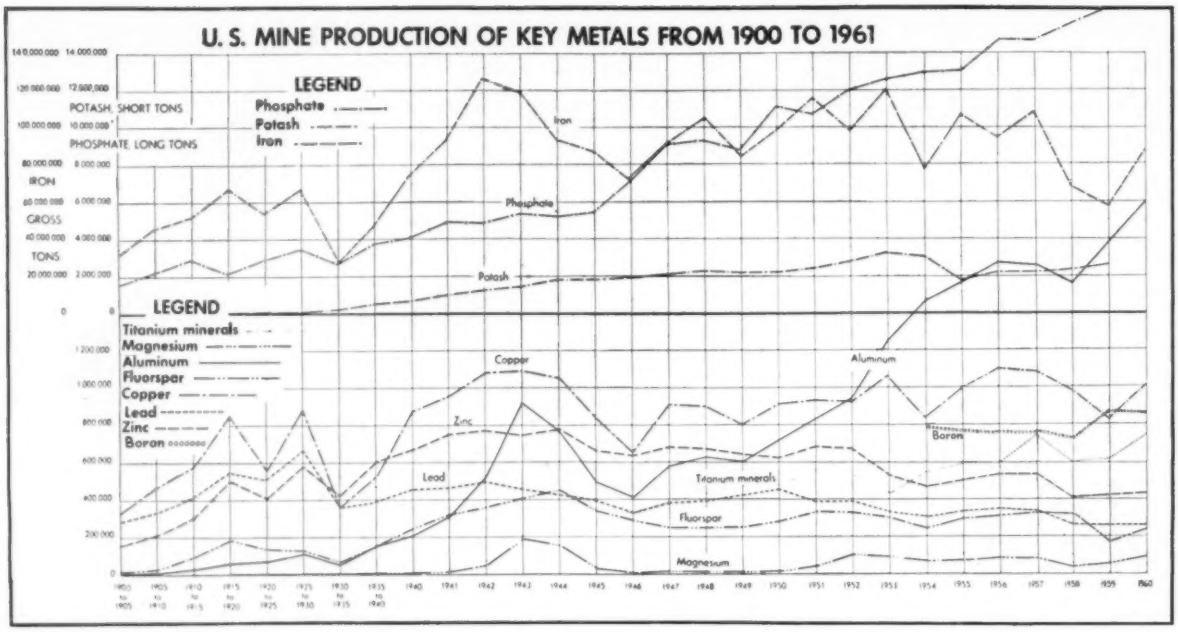
Manganese Steel Sheaves
Timken Tapered Roller Bearings

These blocks can be fitted with any type of hook or alloy shackle.

SKOOKUM BUILDS ANYTHING IN BLOCKS, FORGINGS, FAIRLEADS.

Quality Products Since 1890

The SKOOKUM CO., Inc.



state was the Midnite mine in southern Stevens County, though ore was also produced by operators in the Mount Spokane area, Spokane County. Dawn Mining Company operated the Midnite mine and acquired the Stevens property in the same locality during the year. The Dawn Company uranium mill at Ford treated ore from its own operations and custom shipments. A contract with the A.E.C. involving purchase of the entire mill output was extended to 1966.

Production of copper was reported from the Kromona mine in Snohomish County, and copper was also recovered as a by-product of lead-zinc mining in the Metaline district. The Kulzer iron mine in Stevens County was shut down during the year.

Kenite Corporation of Quincy, Grant County, continued to be the only source of diatomite in the State with production 25 percent greater than 1959. The output of gypsum by Agro Minerals, Inc. at Poison Lake near Tonasket, Okanogan County, was about 44 percent higher than in 1959. Crude magnesite production by Northwest Magnesite Company at its Chewelah operation in Stevens County was about 12 percent lower than in 1959.

United Pacific Aluminum Corporation announced plans to construct an aluminum reduction plant at Longview.

Wyoming

Uranium and trona production increased while iron ore and phosphate rock declined

During 1960 significant increases were recorded in the value of production of uranium and sodium carbonate (trona), but declines were noted in the value of iron ore, phosphate rock, and sodium sulfate.

The value of uranium production increased 65 percent over 1959. The 492-ton mill of Globe Mining Company, a subsidiary of Union Carbide Corporation, started processing ore in January, and all five of the uranium mills in Wyoming were operated at capacity most of the year. Producers in Fremont, Natrona, and Crook Counties supplied most of the ore mined in the state.

Utah Construction & Mining Company mined the first commercial uranium ore from the Shirley Basin, and processed it in the Lucky Mc mill in the Gas Hills. Mine production by the middle of the year was 140 tons a day averaging 0.6 percent U_3O_8. Petrotomics Company (a corporate combine of Kerr-McGee Oil Industries, Inc., Tidewater Oil Company,

BERYLLIUM analyses in minutes

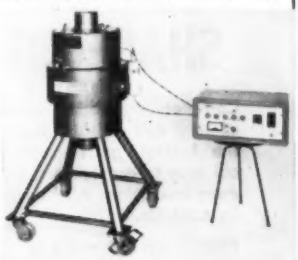
In the field . . . *The portable Beryllium Detector Model 300*

Light weight
Operated by one person
Determines beryllium content in rocks and ores as low as .05% BeO
Highly stable electronic circuits

In the laboratory . . . *The Beryllium Analyser Model 200*

Determines the beryllium content of ore samples as low as .01% BeO by weight
Convenient to use
Approved by the AEC for use in an unrestricted area

In the process plant . . . *The Beryllium Process Analyser Model 400*



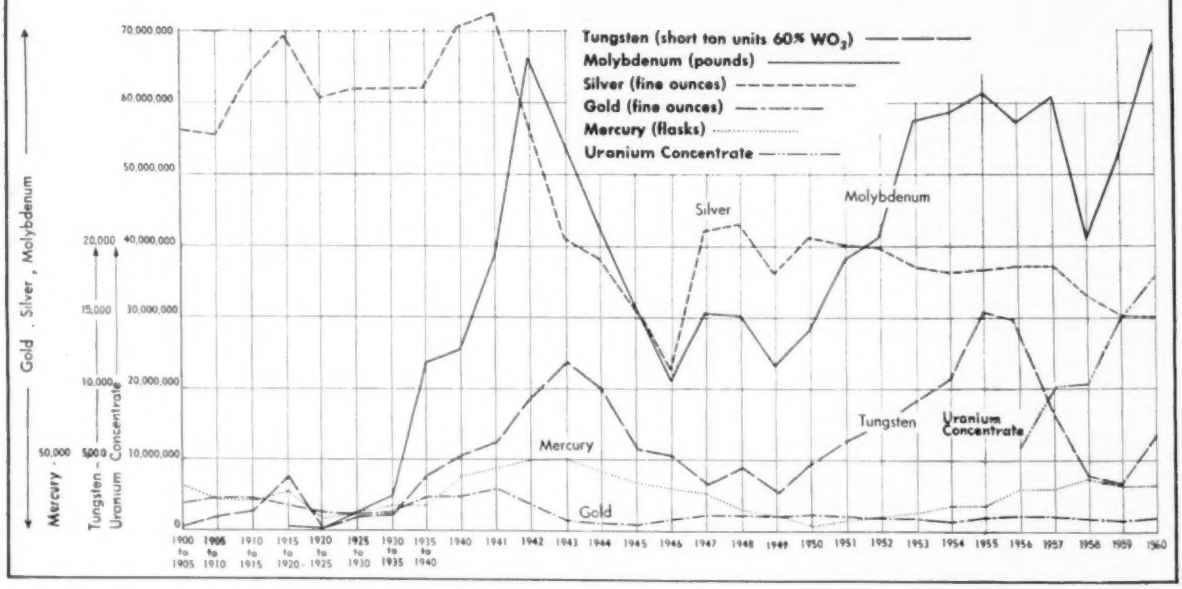
Will give repeated analyses every few minutes of the beryllium content of a process stream
Can be used to control flow conditions
A **must** for the modern process plant
Approved by the AEC for use in an unrestricted area

For further information on these proven instruments: write to

BOULDER SCIENTIFIC COMPANY

250 Pearl Street Boulder, Colorado

U. S. MINE PRODUCTION OF KEY METALS FROM 1900 TO 1961



Skelly Oil Company, and Getty Oil Company) was awarded a contract by the Atomic Energy Commission which provides for the purchase of 1,024,000 pounds of U_3O_8 concentrates before March 31, 1962; and 3,158,800 pounds of concentrates between that date and December 31, 1966. The Petrotomics Company has permission by the AEC to build a mill and construction is expected to start in early 1961. A pilot plant is being built at Golden, Colorado, as a model for the mill which will employ a new process.

The proposed $73,000,000 taconite-iron mining project of Columbia-Geneva Steel Division of United States Steel at Atlantic City passed from the planning into the development stage during the year. A contract was awarded to Pomeroy-Bechtel Joint Venture for starting the open pit and constructing the beneficiating plant. A subcontract was awarded to Arthur G. McKee and Company for construction of the 4,000-ton-per-day pelletizing plant. Laying of rail was started for the 76-mile railroad spur. Exploration has indicated 300,000,000 tons of taconite ore containing 21.8 to 35.2 percent iron, with initial production scheduled for late 1962.

The Colorado Fuel and Iron Corporation continued production of high-grade iron ore from the Sunrise mine in Platte County, and Magnetite Products Corporation produced a small quantity of iron ore from its Cobar mine in Albany County.

Stauffer Chemical Company started work on a $20,000,000 facility for mining and processing trona 21 miles northwest of Green River. Shaft sinking began in November and a 10-mile railroad spur was started in December. Completion of the project is expected in 1962 with a production capacity of between 200,000 and 300,000 tons annually. Intermountain Chemical Company operated its mine and processing plant near rated capacity during the year. An announcement was made about plans to expand facilities to permit production of 700,000 to 750,000 tons annually by 1962. Diamond Alkali Company continued exploration for trona in the area west of Green River. Texota Oil Company, Utah Construction & Mining Company, Ruby Chemical Corporation, and Allied Chemical Corporation also showed an interest in trona during the year.

SINCE 1906

PIPE • VALVES • FITTINGS

Light Weight Welded Steel Pipe for Air, Water, and Fan Lines
Plain Ends or Quick Coupling — 4" to 36" diameter
20' or 40' lengths — 10-12-14 gauge

Fittings, Flanges, Valves
For Air and Water

Pipe Fabrication Our Specialty
Coils • Spools • Bends

PACIFIC PIPE COMPANY

401 FOLSOM STREET, SAN FRANCISCO
EXbrook 2-6255

20TH & CYPRESS STS., OAKLAND
GLencourt 2-0122

APPLICATIONS

In the Mining Industry, SWECO Vibro-Energy Separators perform hundreds of screening tasks, both in laboratory testing and production operations. Some of the typical ores and minerals processed are:

- Copper, lead, zinc, iron
- Barium and magnesium
- Lava rock, volcanic ash, vermiculite
- Diatomaceous earths
- Tungsten
- Nepheline syenite
- Tin concentrate (cassiterite)
- Graphite
- Borates, potash
- Uranium liquors

ADVANTAGES

Exclusive three-dimensional, high-frequency vibration principle of SWECO units provides users a unique combination of specific advantages. To the Metallic and Non-Metallic Mining Industry, these product features are of major importance:

- *Highest capacity throughput*
  per square foot of screen cloth area
- *Accurate sizing for all materials*
  coarse to 325 mesh, wet or dry, hot or cold
- *Completely assembled, easy to install*
  light weight, compact design
- *Economical operation,*
  low maintenance, minimum power required
- *Long screen cloth life*
  minimum blinding and cleaning, fast change
- *Flexible, single or multiple deck*
  18", 30", 48" and 60" diam. units
- *No transmitted vibration*
  less wear, quiet, trouble-free operation
- *Create less floating dust*
  also fully enclosed units available

SPECIFICATIONS

General—A wide range of models, for single or multiple deck separation, in 18", 30", 48" and 60" diam. units is available, in stainless or carbon steel, and with dust-tight cover assemblies, if desired. For precision control of material input, optimum capacity and efficiency, the SWECO-ERIEZ HI-VI Feeder is recommended.

Motors—Power requirements average far less than normally consumed by competitive equipment of similar capacity. Special voltages and cycles, or explosion-proof motors also may be ordered.

Spouts and Frames—Standard units have one discharge unit per fraction. Additional spouts may be custom-installed. Tangential spouts, standard on all models, may be oriented to any position. All basic models are fully convertible to any practical screening combination simply by adding spacing frames of required size and equipping with proper screen cloths.

For complete specifications and illustrated catalog, or for *free* demonstration in *your* plant with *your* materials, write Dept. 60283.

THREE DIMENSIONAL VIBRO-ENERGY SCREENING

SWECO

SOUTHWESTERN ENGINEERING COMPANY, 4800 Santa Fe Avenue, Los Angeles 58, California
Engineers • Constructors • Manufacturers

Production of Minerals by States*

Alaska

Mineral	1957 Quantity	1957 Value	1958 Quantity	1958 Value	1959 Quantity	1959 Value	1960* Quantity	1960* Value
Chromite[1]	4,207	$ 431,000	- - -	$ - - -	- - -	$ - - -	- - -	$ - - -
Coal bituminous[1]	842,338	7,296,000	759,000	6,931,000	680,000	5,869,000	669,000	N.A.
Gold[2]	215,467	7,541,000	188,435	6,525,000	179,000	6,262,000	180,000	6,300,000
Lead[1]	9	3,000	2	6	- - -	- - -	- - -	- - -
Mercury[3]	5,461	1,349,000	3,380	774,000	3,743	851,000	4,450	938,000
Sand and gravel[1]	6,096,000	8,790,000	4,255,000	3,871,000	5,859,000	5,265,000	5,892,000	5,345,000
Silver[2]	28,862	26,000	24,000	22,000	21,000	19,000	23,000	21,000
Stone[1]	528,000	1,953,000	615,000	2,065,000	89,000	377,000	80,000	300,000
Undistributed[6]	- - -	1,390,000	- - -	1,253,000	- - -	1,517,000	- - -	6,925,000
TOTAL		$28,792,000		$21,447,000		$20,160,000		$19,829,000

*Estimated. 1. Short tons. 2. Fine ounces. 3. Flasks. 4. Value included with undistributed gem stones and other minerals whose value must be concealed to avoid disclosing company incomes. 5. Includes platinum. 6. Less than $1,000. N. A. Not Available

Nevada

Year	Iron Ore Long Tons	Manganese Plus 35% Tons[2]	60% WO[3] Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	241	2,937	2,289	366,403	5,830,238	78,911	9,263	15,129	$38,959,420
1942	- - -	6,112	3,052	295,112	3,723,435	83,663	5,378	10,197	35,840,168
1943	7,368	10,451	2,910	144,442	1,620,280	71,068	4,790	13,647	28,351,601
1944	38,581	19,800	2,665	119,056	1,259,636	61,232	6,605	20,699	27,371,513
1945	6,196	874	1,857	92,265	1,043,380	52,595	6,275	21,457	24,186,294
1946	3,299	1,067	2,617	90,680	1,250,651	48,616	7,175	22,649	27,026,416
1947	5,452	67	2,002	89,063	1,337,579	49,603	7,161	16,970	31,366,282
1948	8,945	- - -	949	111,552	1,790,020	45,242	9,777	20,288	34,055,480
1949	3,094	- - -	740	130,399	1,800,209	38,058	10,626	20,443	29,615,777
1950	5,465	- - -	1,123	178,447	1,537,217	52,569	9,408	21,606	38,181,872
1951	331,327	58	1,482	121,036	981,669	56,474	7,148	17,443	41,280,596
1952	912,084	105	2,329	117,203	941,195	57,537	6,790	15,357	40,086,746
1953	444,081	20,510[3]	3,233	101,799	697,086	61,850	4,371	5,812	42,177,725
1954	351,250	88,220[3]	4,696	70,067	560,182	70,217	3,041	1,035	45,759,162
1955	324,602	102,000[3]	6,155	72,813	845,397	78,925	3,291	2,670	63,832,670
1956	916,592	121,482	5,400	68,040	933,716	80,824	6,384	7,488	78,154,038
1957	904,455	129,046	1,196	76,752	958,477	77,750	5,979	5,292	53,297,028
1958	594,000	127,322	(4)	105,087	932,728	66,137	4,150	91	40,300,000
1959	698,000	56,586	(4)	113,443	611,135	57,375	1,357	217	40,114,000
1960[1]	748,000	48,100	(4)	59,900	762,400	77,220	1,080	400	52,549,000

1. Estimated by U. S. Bureau of Mines. 2. Shipments to Government low-grade depot and custon mills not included. 3. Long tons. 4. Figure withheld to avoid disclosing individual company data.

Montana

Year	60% WO[3] Tons	Manganese Plus 35% Tons[2]	Chromite[1] Tons	Fluorspar Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	7	43,555	- - -	- - -	246,475	12,386,925	128,036	21,259	60,710	$ 59,181,627
1942	- - -	120,409	65,238	- - -	146,892	11,188,118	141,194	20,050	54,715	60,129,853
1943	1	120,789	75,691	- - -	59,586	8,450,370	134,525	16,324	37,606	53,642,648
1944	25	153,665	1,251	- - -	50,021	7,093,215	118,190	13,105	30,127	49,039,855
1945	- - -	143,888	- - -	- - -	44,597	5,943,070	88,506	9,999	17,403	35,405,505
1946	84	129,227	- - -	- - -	70,507	3,273,140	58,481	8,280	16,770	29,957,206
1947	4	123,490	- - -	- - -	90,124	6,326,190	57,900	16,108	45,679	48,890,964
1948	- - -	119,339	- - -	318	73,091	6,930,716	58,252	18,411	59,095	56,422,609
1949	9	107,399	- - -	422	52,274	6,327,025	56,611	17,996	54,193	49,003,447
1950	- - -	119,694	- - -	41	51,764	6,590,747	54,478	19,617	67,678	54,956,689
1951	- - -	91,080	- - -	- - -	30,502	6,393,768	57,406	21,302	75,888	73,149,813
1952	1	90,772	- - -	16,160	24,161	6,138,185	61,948	21,279	82,185	70,521,092
1953	14	113,429	26,089	5,932	24,768	6,690,000	77,617	19,949	80,271	75,162,000
1954	678	N.A.	N.A.	15,102	23,660	5,177,942	59,349	14,820	60,952	57,756,621
1955	1,211	106,026	118,703	25,223	28,123	6,080,390	81,542	17,028	68,588	89,264,689
1956	1,230	80,553	118,780	59,775	38,121	7,384,908	96,426	18,642	70,520	115,157,023
1957	661	68,298	119,149	64,339	32,766	5,558,228	91,512	13,300	50,520	76,791,951
1958	- - -	53,123	119,057	53,564	26,003	3,631,000	90,683	8,434	33,238	60,650,000
1959	- - -	21,604	105,381	18,542	28,551	3,420,000	65,911	7,672	27,848	52,729,000
1960[2]	- - -	(3)	106,478	(3)	45,840	3,463,000	93,190	4,860	11,800	68,557,000

1. Gross weight short tons. 2. Estimated by U. S. Bureau of Mines. 3. Figure withheld to avoid disclosing individual company data. N. A. Not Available

California

Year	Iron Ore Long Tons	Chromite Tons	Mercury Flasks	60% WO[3] Tons	Boron Minerals Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	60,293	13,419	25,714	2,603	301,282	1,408,793	2,154,188	3,943	3,464	440	$52,231,066
1942	95,107	44,873	28,906	3,483	266,723	847,997	1,450,440	1,058	5,151	613	31,771,607
1943	794,440	62,495	33,812	3,871	256,633	148,328	609,075	8,762	5,820	1,856	9,176,616
1944	845,260	34,715	23,052	3,027	277,586	117,373	778,936	12,721	5,682	8,455	10,933,495
1945	280,573	9,607	21,199	1,073	325,935	147,938	986,798	6,473	7,224	9,923	11,152,081
1946	340,491	4,107	17,782	1,262	430,689	356,824	1,342,651	4,240	9,923	6,877	18,788,664
1947	530,434	948	17,165	394	501,935	431,415	1,597,442	2,407	10,080	5,415	21,769,620
1948	153,684	274	11,188	1,767	450,932	421,473	724,771	481	9,110	5,325	20,294,093
1949	536,525	433	4,493	952	467,592	417,231	783,880	649	10,318	7,209	20,616,562
1950	831,445	404	3,850	2,025	647,735	412,118	1,071,917	696	15,831	7,551	22,081,859
1951	1,198,847	6,302	4,282	3,007	862,797	339,732	1,145,219	921	13,967	9,602	21,700,575
1952	1,516,373	14,713	7,241	2,980	583,828	258,176	1,099,658	800	11,199	9,419	17,151,792
1953	1,697,652	26,512	9,290	2,130	715,228	234,591	1,036,072	382	8,664	5,358	12,870,230
1954	1,270,292	30,661	11,262	3,089	780,449	237,886	309,575	362	2,671	1,415	9,857,265
1955	1,776,536	22,105	9,875	4,383	924,496	251,737	954,181	613	8,265	6,836	14,276,301
1956	2,414,277	27,083	9,017	3,719	568,087[4]	193,816	938,139	859	9,296	8,049	13,487,143
1957	2,635,000[4]	34,901	16,511	1,750	541,124	170,885	522,288	945	3,458	2,969	8,701,000
1958	3,109,859	20,588	22,365	N.A.	528,209	185,385	188,000	749	140	51	7,096,000
1959	3,564,558	(3)	17,100	N.A.	619,946	146,141	173,000	663	227	78	5,748,000
1960[2]	3,213,500	(3)	18,200	N.A.	617,900	122,200	134,300	680	340	250	4,978,000

1. Reported as B_2O_3 content of ore. 2. Estimated by U. S. Bureau of Mines. 3. Figure withheld to avoid disclosure of company confidential data. 4. Net tons. N. A. Not Available

* Dollar value shown only for base and precious metals unless otherwise indicated

Idaho

Year	Phosphate Long Tons	Mercury Flasks	60% WO[3] Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	97,274	N.A.	663	148,816	16,672,410	3,621	104,914	79,084	$41,876,848
1942	115,263	N.A.	2,132	95,020	14,644,890	3,430	113,909	87,256	46,063,326
1943	108,916	4,261	4,878	30,808	11,700,180	2,324	96,457	86,707	43,199,910
1944	112,565	1,332	3,957	25,008	9,931,614	1,688	83,530	91,372	42,591,137
1945	123,340	627	2,130	17,780	8,142,667	1,348	68,447	83,463	37,799,975
1946	312,658	868	641	42,975	6,491,104	1,038	59,987	71,507	37,610,123
1947	845,045	886	61	64,982	10,345,779	1,640	78,944	83,069	55,164,670
1948	434,375	543	86	58,454	11,448,875	1,624	88,544	86,267	67,758,299
1949	471,305	- - -	66	77,829	10,049,257	1,438	79,299	76,555	56,429,796
1950	573,044	- - -	222	79,652	16,095,019	2,107	100,025	87,890	70,198,647
1951	695,026	357	377	45,064	14,753,023	2,160	76,713	78,121	70,953,653
1952	620,551	887	333	32,997	14,923,165	3,213	73,719	74,317	64,626,967
1953	1,001,969	N.A.	441	17,630	13,636,680	2,100	69,885	68,650	47,729,814
1954	1,092,817	- - -	450	13,245	15,867,414	4,828	69,302	61,528	49,951,702
1955	1,329,959	1,107	642	10,572	13,831,458	5,618	64,163	53,314	49,315,034
1956	1,438,151	3,394	582	9,210	13,471,916	6,656	64,321	49,561	51,949,222
1957	1,306,742	2,260	35	12,301	15,067,420	7,912	71,637	57,831	52,735,309
1958	1,291,000	2,625	(2)	15,896	15,953,000	9,846	53,603	49,725	42,860,000
1959	1,610,000	1,961	(2)	10,479	16,636,000	8,713	62,395	55,699	47,936,000
1960[1]	1,950,000	1,804	(2)	5,620	13,040,000	4,060	41,080	37,240	33,786,000

1. Estimated by U.S. Bureau of Mines. N.A. Not Available. 2. Figure withheld to avoid disclosure of company data.

Arizona

Year	Uranium Ore, Tons	Molybdenum Pounds	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941		N.A.	315,392	7,498,260	326,317	15,638	16,493	$ 97,638,310
1942		N.A.	253,651	7,064,467	393,387	14,772	18,522	114,525,600
1943		N.A.	171,810	5,713,889	403,181	13,727	19,677	121,212,902
1944		N.A.	112,162	4,394,039	358,303	16,707	29,077	113,094,806
1945		N.A.	77,223	3,558,216	287,203	22,867	40,226	95,963,006
1946		N.A.	79,024	3,268,765	289,223	23,830	43,665	114,986,254
1947		N.A.	95,860	4,569,084	366,218	26,566	54,644	182,752,537
1948		N.A.	109,487	4,837,740	375,121	29,899	54,478	196,207,948
1949		N.A.	108,993	4,970,736	359,021	33,368	70,658	177,894,134
1950		N.A.	118,313	5,320,441	403,301	26,383	60,480	201,033,694
1951		1,172,740	116,093	5,120,985	415,870	17,394	52,999	235,289,045
1952		2,022,832	112,355	4,701,330	395,719	16,520	47,143	220,686,278
1953		1,446,557	112,824	4,351,429	393,525	7,092	19,613	242,572,489
1954		1,538,088	114,809	4,298,811	377,927	8,385	21,461	237,818,952
1955		1,497,000	127,616	4,634,179	454,105	9,817	22,684	325,928,786
1956		2,392,000	146,110	5,179,185	505,908	11,999	25,580	433,270,137
1957		2,385,000	152,000	5,279,000	516,000	12,000	34,000	332,082,000
1958	257,756	2,320,000	142,979	4,685,000	485,839	11,890	28,532	273,398,000
1959	253,390	3,181,000	124,627	3,898,000	430,297	9,999	37,325	282,977,000
1960[1]	280,000	4,314,000	145,600	4,751,000	539,300	8,600	36,300	365,908,000

1. Estimated by U.S. Bureau of Mines. N.A. Not Available

Colorado

Year	Molybdenum Pounds	60% WO[3] Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	27,751,273	646	380,029	7,301,697	6,748	12,574	15,722	$23,877,597
1942	41,852,136	380	268,627	3,096,211	1,102	15,181	32,215	19,896,623
1943	46,133,715	378	137,558	2,664,142	1,028	18,032	44,094	19,205,415
1944	23,608,421	296	111,455	2,248,830	1,048	17,698	39,995	17,724,473
1945	18,525,041	234	100,935	2,226,780	1,485	17,044	35,773	16,676,521
1946	10,816,426	213	142,613	2,240,151	1,754	17,036	36,147	19,903,509
1947	11,512,719	68	168,279	2,557,653	2,150	18,696	38,745	23,868,179
1948	13,172,094	208	154,802	3,011,011	2,298	25,143	45,164	30,155,337
1949	10,752,817	222	102,618	2,894,886	2,403	26,853	47,703	27,474,322
1950	11,903,043	196	130,390	3,492,378	3,141	27,007	45,776	29,323,268
1951	22,538,739	336	116,503	2,787,882	3,212	30,336	55,714	38,931,539
1952	23,874,408	625	124,594	2,813,643	3,606	30,066	53,203	35,997,231
1953	37,306,341	864	119,218	2,200,000	2,941	21,754	37,809	22,247,780
1954	42,544,795	927	96,146	3,417,072	4,523	17,823	35,150	21,602,205
1955	43,043,000	1,152	88,577	2,772,073	4,323	15,805	35,350	22,240,009
1956	37,489,000	873	97,668	2,284,701	4,228	19,858	40,246	26,342,138
1957	42,466,000	45	88,000	2,788,000	5,000	21,000	47,000	25,590,000
1958	25,079,000	(4)	79,539	2,056,000	4,193	14,112	37,132	17,727,000
1959	36,556,000	(4)	61,097	1,341,000	2,940	12,907	35,388	16,264,000
1960[1]	52,500,000	(4)	62,500	1,714,000	3,300	18,650	31,300	18,253,000

1956	Vanadium[2]	5,582,484	Uranium Ore[3]	- - -
1957	Vanadium[2]	6,264,000	Uranium Ore[3]	740,000
1958	Vanadium[2]	4,791,000	Uranium Ore[3]	939,706
1959	Vanadium[2]	5,897,000	Uranium Ore[3]	1,044,089
1960[1]	Vanadium[2]	(4)	Uranium Ore[3]	1,150,900

1. Preliminary, U.S. Bureau Mines. 2. Pounds. 3. Short Tons. 4. Figure withheld to avoid disclosure of Company information.

Oregon

Year	Nickel Tons[2]	Mercury Flasks	Chromite Tons	Gold Ounces	Silver Ounces	Dollar Value
1941	- - -	9,032	840	96,525	276,158	$3,576,154
1942	- - -	6,936	2,683	46,233	87,376	1,680,289
1943	- - -	4,651	16,363	1,097	10,527	45,878
1944	- - -	3,159	7,818	1,369	20,243	62,310
1945	- - -	2,500	4,366	4,467	10,461	163,874
1946	- - -	1,326	N.A.	17,598	6,927	621,527
1947	- - -	1,185	- - -	18,979	30,379	691,758
1948	- - -	1,351	3,345	14,611	13,596	523,690
1949	- - -	1,167	- - -	16,226	12,195	578,947
1950	- - -	5	- - -	11,058	13,565	398,307
1951	- - -	1,177	754	7,927	6,218	283,073
1952	- - -	868	6,591	5,509	4,037	196,469
1953	- - -	648	6,216	8,250	6,930	295,022
1954	1,993	491	6,665	6,520	14,335	241,174
1955	4,181	1,056	5,341	1,708	8,815	67,758
1956	6,866	1,893	54,577	2,738	13,542	108,086
1957	12,276	3,993	7,900	3,381	15,924	132,747
1958	12,697	2,276	4,133	1,423	2,728	52,000
1959	12,374	1,224	- - -	686	242	24,350
1960[1]	12,600	476	- - -	674	230	24,210

1. Estimated by U. S. Bureau of Mines. 2. Nickel content of ore.

Illinois

Year	Fluorspar Tons	Lead Tons	Zinc Tons
1951	204,328	3,160	21,776
1952	188,293	4,262	18,816
1953	163,303	3,391	14,556
1954	107,830	3,232	14,427
1955	166,337	4,544	21,700
1956	178,254	3,832	24,039
1957	169,939	2,970	22,185
1958	152,087	1,610	24,940
1959	112,469	2,570	26,815
1960[1]	140,000	2,900	28,300

1. Estimated by U. S. Bureau of Mines.

Missouri

Year	Iron Ore Tons	Lead Tons	Zinc Tons	Copper Tons	Silver Fine Ounces
1941	- - -	165,909	21,932	1,400	169,027
1942	- - -	199,548	36,394	1,300	69,106
1943	- - -	184,910	30,413	1,340	111,285
1944	- - -	174,683	36,626	3,302	92,243
1945	- - -	176,575	22,175	3,399	94,822
1946	- - -	139,112	22,234	1,857	68,401
1947	- - -	132,246	17,074	1,760	93,600
1948	- - -	102,288	6,463	2,370	114,187
1949	- - -	127,522	5,911	3,670	123,413
1950	- - -	134,626	8,189	2,282	236,273
1951	- - -	123,702	11,476	2,422	184,424
1952	- - -	129,245	13,986	2,656	517,432
1953	- - -	125,895	9,981	1,374	359,781
1954	- - -	125,250	5,210	1,925	352,971
1955	- - -	125,412	4,476	1,722	438,000
1956	- - -	123,783	4,380	1,800	295,111
1957	- - -	126,345	2,951	1,604	183,427
1958	387,000	113,123	362	1,429	251,000
1959	349,000	105,165	92	1,065	340,000
1960[1]	379,000	112,687	1,768	989	20,000

1. Estimated by U. S. Bureau of Mines.

New Jersey, New York, Pennsylvania, and Virginia

	1958	1959	1960[1]
New Jersey			
Zinc[2]	607	(6)	(6)
Iron[3]	(6)	(6)	(6)
New York			
Silver[4]	67,000	52,000	17,000
Lead[2]	570	481	651
Zinc[2]	53,014	43,464	69,082
Pennsylvania			
Cobalt[5]	564,362	280,098	415,124
Zinc[2]	10,812	16,718	12,268
Virginia			
Manganese[2]	8,128	6,232	- - -
Zinc[2]	18,472	20,334	18,199
Lead[2]	2,934	2,770	11,861

1. Estimated by U. S. Bureau of Mines. 2. Short tons. 3. Long tons. 4. Fine Ounces. 5. Pounds. 6. Cannot be disclosed.

Wyoming

Minerals	1958	1959	1960[1]
Iron[2]	557,000	503,000	425,000
Uranium[3]	651,790	864,582	1,376,000
Phosphate Rock[2]	124,000	177,000	200,000

1. Estimated by U.S. Bureau of Mines and Mining World. 2. Long tons. 3. Short tons.

Oklahoma

Year	Lead Tons	Zinc Tons
1941	25,021	166,602
1942	22,806	146,510
1943	19,733	114,085
1944	13,944	91,449
1945	12,664	69,300
1946	13,697	69,552
1947	14,289	51,062
1948	16,918	43,821
1949	19,858	44,033
1950	20,724	46,739
1951	16,575	53,450
1952	15,137	54,916
1953	9,304	33,413
1954	14,204	43,171
1955	14,126	41,543
1956	12,350	27,515
1957	7,183	14,951
1958	3,692	5,267
1959	601	1,049
1960[1]	1,166	2,588

1. Estimated by U.S. Bureau of Mines.

Michigan

Year	Copper Tons	Iron Ore Long Tons
1941	46,440	15,201,619
1942	45,679	16,129,474
1943	46,764	14,510,357
1944	42,421	15,425,788
1945	30,401	11,865,624
1946	21,663	8,756,802
1947	24,184	12,965,482
1948	27,777	12,896,478
1949	19,506	11,199,024
1950	25,698	12,681,101
1951	24,979	13,703,901
1952	21,699	11,799,366
1953	24,097	14,326,074
1954	23,593	9,709,167
1955	50,066	14,143,509
1956	61,526	12,536,009
1957	58,400	13,122,875
1958	58,005	8,111,646
1959	55,300	7,247,000
1960[1]	56,000	10,750,000

1. Estimated by U. S. Bureau of Mines.

Tennessee

Year	Phosphate Rock Long Tons	Gold Ounces	Silver Ounces	Copper Tons	Zinc Tons	Dollar Value
1950	1,384,473	160	39,958	6,851	35,326	$22,983,278
1951	1,419,892	108	24,960	7,069	38,639	28,121,844
1952	1,452,508	241	57,569	7,620	38,020	27,267,054
1953	1,622,170	293	68,935	7,829	38,465	25,666,824
1954	1,633,226	218	60,759	9,087	30,326	22,716,838
1955	1,465,902	221	66,619	9,911	40,216	27,881,089
1956	1,685,003	189	64,878	10,449	46,023	33,201,978
1957	1,812,000	172	54,407	9,790	58,063	31,933,000
1958	1,903,000	124	44,592	9,109	59,130	29,938,000
1959	1,755,000	99	59,739	11,490	89,932	27,796,000
1960[1]	1,800,000	70	53,000	13,000	91,000	31,848,000

1. Estimated by U.S. Bureau of Mines

Utah

Year	Iron Ore Long Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	397,607	356,501	11,395,485	266,838	69,601	42,049	$ 97,796,623
1942	359,558	391,544	10,574,955	306,681	71,930	45,543	113,552,848
1943	922,959	390,470	9,479,340	323,898	65,257	46,896	124,562,540
1944	1,542,284	344,223	7,593,075	282,575	52,519	38,994	111,036,247
1945	1,931,749	279,979	6,106,545	226,376	40,817	33,630	90,018,641
1946	1,317,176	178,333	4,118,453	114,284	30,711	28,292	60,202,627
1947	2,823,853	421,662	7,780,032	266,533	49,698	43,673	158,624,849
1948	3,233,413	368,422	8,045,329	227,007	55,950	41,490	149,763,677
1949	2,712,390	314,058	6,724,880	187,245	53,072	40,670	121,649,828
1950	3,139,926	457,551	7,083,808	278,630	44,753	31,678	159,415,431
1951	4,726,159	432,216	7,310,665	271,086	50,451	34,317	182,897,139
1952	4,060,003	435,507	7,194,109	282,394	50,210	32,947	185,780,497
1953	4,617,288	483,430	6,725,807	269,496	41,522	29,184	195,289,033
1954	3,040,646	403,401	6,179,243	211,835	44,972	34,031	164,367,236
1955	3,847,402	441,206	6,250,565	232,949	50,452	43,556	220,628,713
1956	4,001,734	416,031	6,572,041	250,604	49,555	42,374	260,693,260
1957	4,156,000	378,000	6,198,000	238,000	44,000	41,000	184,240,000
1958	3,514,000	307,824	5,278,000	189,184	40,355	44,982	133,681,000
1959	2,842,000	239,517	3,734,000	144,715	36,630	35,223	117,144,000
1960[1]	3,368,000	373,300	4,731,000	219,400	37,400	34,100	175,239,000
1957	Uranium Ore[2]		1,076,000				
1958	Uranium Ore[2]		1,239,767				
1959	Uranium Ore[2]		1,210,654				
1960[1]	Uranium Ore[2]		1,071,000				

1. Estimated by U. S. Bureau of Mines. 2. Short Tons.

Florida

Year	Phosphate Rock Long Tons	Titanium Minerals Tons
1950	8,085,870	(2)
1951	8,496,831	(2)
1952	8,781,125	(2)
1953	9,331,002	178,818
1954	10,437,197	182,421
1955	8,747,282	238,500
1956	11,822,145	283,956
1957	10,191,000	263,000
1958	10,851,000	190,000
1959	11,564,000	262,000
1960[1]	12,424,000	289,000

1. Estimated by U. S. Bureau of Mines.

Wisconsin

Year	Iron Ore Long Tons	Lead Tons	Zinc Tons
1950		532	5,722
1951	1,745,120	1,391	15,754
1952	1,485,845	2,000	20,588
1953	1,655,331	2,094	16,830
1954	1,428,910	1,261	15,534
1955	1,886,029	1,948	18,326
1956	1,488,361	2,582	23,890
1957	1,576,057	1,900	21,575
1958	867,000	800	12,140
1959	701,000	745	11,635
1960[1]	1,485,000	1,300	19,200

1. Estimated by U.S. Bureau of Mines

New Mexico

Year	Potassium Salts K_2O Equivalent Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	433,677	27,845	1,328,317	73,478	4,668	37,862	$25,471,416
1942	548,730	11,961	676,170	80,100	4,608	46,461	29,542,885
1943	604,414	5,563	463,583	76,163	5,723	59,524	34,042,378
1944	678,721	6,818	535,275	69,730	7,265	50,727	32,178,026
1945	733,176	5,604	465,127	56,571	7,662	40,295	26,386,781
1946	789,473	4,009	338,000	50,191	4,899	36,103	26,522,417
1947	880,605	3,146	515,833	60,205	6,383	44,103	38,374,269
1948	967,945	3,414	537,674	74,687	7,653	41,502	46,799,576
1949	932,497	3,249	380,855	55,388	4,652	29,346	31,029,120
1950	1,072,722	3,414	338,581	66,300	4,150	29,263	37,437,915
1951	1,217,717	3,950	443,267	73,558	5,846	45,419	54,697,048
1952	1,411,125	2,949	478,318	76,112	7,021	50,975	56,559,692
1953	1,562,831	2,614	205,000	72,477	2,943	13,373	45,725,959
1954	1,732,240	3,539	109,132	60,558	887	6	36,196,189
1955	1,826,118	1,917	251,072	66,417	3,296	15,277	54,581,760
1956	1,930,754	3,257	392,967	74,345	6,042	35,010	75,153,458
1957	2,080,000	3,000	309,000	67,000	5,000	33,000	50,106,000
1958	1,978,000	3,378	159,000	55,540	1,117	9,034	31,580,000
1959	2,189,000	3,155	159,000	39,688	829	4,636	25,880,000
1960[1]	2,422,000	5,400	311,000	67,400	2,200	13,800	47,676,000
1958	Uranium Ore[2]		1,888,499				
1959	Uranium Ore[2]		3,269,826				
1960[1]	Uranium Ore[2]		3,757,200				

1. Estimated by U. S. Bureau of Mines. 2. Short tons.

Kansas

Year	Lead Tons	Zinc Tons
1946	6,445	47,703
1947	7,285	41,497
1948	8,386	35,577
1949	9,772	29,433
1950	9,487	27,176
1951	8,947	28,904
1952	5,916	25,482
1953	3,347	15,515
1954	4,033	19,110
1955	5,498	27,611
1956	7,635	28,665
1957	4,257	15,859
1958	1,299	4,421
1959	481	1,017
1960[1]	820	1,862

1. Estimated by U.S. Bureau of Mines.

Minnesota

Year	Long Tons	Content %
1946	49,055,340	51.48
1947	62,436,102	50.99
1948	67,923,237	49.86
1949	55,943,714	50.25
1950	64,538,759	49.37
1951	78,164,527	50.53
1952	63,906,069	50.16
1953	80,533,670	50.31
1954	48,613,338	50.94
1955	69,419,334	50.65
1956	62,637,317	51.49
1957	67,656,040	52.49
1958	42,502,226	52.63
1959	36,109,000	54.11
1960[1]	54,650,000	54.60

1. Estimated by U.S. Bureau of Mines.

South Dakota

Year	Uranium Ore	Feldspar (Crude) Long Tons	Beryllium Concentrate Tons	Gold Ounces	Silver Ounces	Dollar Value
1941	- - -	59,015	151	600,637	170,771	$21,143,732
1942	- -	56,449	205	522,098	186,937	18,406,363
1943	- - -	70,913	238	106,444	35,886	3,751,059
1944	- - -	64,806	306	11,621	5,445	410,607
1945	- - -	68,374	38	55,948	26,564	1,977,070
1946	- - -	74,540	95	312,247	86,901	10,998,861
1947	- - -	58,959	70	407,194	111,684	14,359,766
1948	- - -	54,037	45	377,850	94,693	13,323,894
1949	- -	32,272	69	464,650	109,383	16,363,011
1950	- - -	43,875	96	567,996	142,069	20,008,436
1951	-	48,559	138	458,101	139,590	16,159,871
1952	-	40,163	334	482,534	132,102	17,008,249
1953	- -	50,601	392	534,987	138,642	18,850,023
1954	- -	44,488	337	541,445	151,407	19,087,606
1955	- -	42,164	294	528,865	154,092	19,109,068
1956	- -	45,184	195	568,523	136,118	20,310,537
1957	- - -	41,000	268	568,000	135,000	20,007,000
1958	35,489	23,229	240	570,830	153,000	20,117,000
1959	45,734	30,825	156	577,730	124,000	20,334,000
1960[1]	33,400	41,665	150	550,500	110,000	19,368,000

1. Estimated by U. S. Bureau of Mines.

Washington

Year	Uranium Ore Tons	Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941		84,176	402,030	8,686	3,903	13,320	$ 7,874,886
1942		75,396	369,038	8,030	4,851	14,398	8,172,609
1943		65,244	370,440	7,365	5,022	12,203	7,838,012
1944		47,277	321,608	6,164	5,825	11,904	7,195,136
1945		57,860	281,444	5,281	3,802	11,693	7,140,242
1946		51,168	264,453	4,527	2,987	11,329	6,886,748
1947		34,965	293,736	2,240	5,259	13,800	7,313,398
1948		70,075	375,831	5,665	7,147	12,638	11,171,715
1949		71,994	357,853	5,275	6,417	10,740	9,613,307
1950		62,117	363,566	5,057	10,344	14,807	12,652,302
1951		67,405	344,948	4,089	8,002	18,189	14,030,884
1952		54,776	315,645	4,357	11,744	20,102	14,767,054
1953		62,560	321,000	3,740	11,064	32,786	15,067,000
1954		66,740	313,735	3,636	9,938	22,304	12,305,762
1955		74,360	436,348	3,958	10,340	29,536	16,297,361
1956	N.A.	70,669	448,442	1,926	11,657	25,640	16,043,542
1957	N.A.	N.A.	N.A.	1,700	12,734	24,000	
1958	N.A.	N.A.	N.A.	52	9,020	18,797	5,973,000[2]
1959	152,336	N.A.	N.A.	49	10,310	17,111	6,337,000[2]
1960[1]	172,200	N.A.	N.A.	87	7,225	21,220	10,459,000[2]

1. Estimated by U. S. Bureau of Mines. 2. Copper, lead, zinc, uranium only.
N.A. Not Available.

A survey of WORLD WIDE mining activities

Algeria

In Algeria, the year 1960 was marked by a very pronounced resumption of mining activity. The improvement was particularly notable in the production of pyrite (up 32 percent) and iron ore (up 78 percent). For pyrite, efforts now being made by the technical management of the mines give rise to hopes for competitive prices on the international market. For iron ore, the average of 300,000 tons per month was exceeded from March to July, and almost attained that of the record year 1955. This was achieved, it is true, through an authorized reduction in the sale price. These favorable conditions even allowed resumption of underground exploration and the reopening of one mine.

Production of phosphates was slightly less (down four percent), but studies of the placing into production of the Djebel Onk deposits were practically finished, and a railroad was constructed.

Production of copper ore increased by 80 percent; that of zinc ore increased slightly.

Preparatory work at the Belelieta tungsten deposit was finished, and production of the ore was scheduled for early 1961.

Construction of the metallurgical plant at Bône should give added impetus to the Algerian mining industry in the near future.

Principal Mineral Products in Algeria in Metric Tons During 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Iron ore	2,334,700	1,927,000	3,438,000
Lead ore	14,700	15,300	15,000
Zinc ore	54,800	62,800	65,000
Antimony ore	3,100	4,000	2,300
Copper ore	1,600	300	500
Iron pyrites	24,700	29,100	39,000
Phosphate of lime	560,900	572,000	548,000
Pulverized barite	43,000	42,000	45,000
Bentonite	138,000	119,000	100,000
Kieselguhr	26,000	29,000	22,000

Angola

Diamond production in 1960 again exceeded 1,000,000 carats, of which more than 80 percent of the output was from the Angola Diamond Company (DIAMANG) which has exclusive rights over about 390,000 square miles in Angola and the rights to work all alluvial or other diamondiferous deposits in that area.

Development of bauxite deposits in the Dondo district was begun by Aluminio Portuguese in preparation for building an aluminum plant which is scheduled to start operations in late 1962. Initial capacity of 25,000 tons of aluminum will later be doubled. The Cambambe hydroelectric project on the Middle Guanza River will supply power for the plant. Pechiney of France has a 10 percent interest in the Angola aluminum firm.

A joint iron and manganese mining venture was undertaken by several Portuguese, German, Danish, and Angola firms, which expect to export some $40,000,000 worth of ore annually by 1963. Production and transportation of ore to the Angola port of Mocamedes is anticipated to be at the rate of some 3,500 tons a day. Cia. Mineira do Lobito has been developing the iron ore property near Cassinga for several years and has been shipping small amounts of ore. Under the expanded operation this Angola firm will continue in a major role. Plans reportedly cover a crushing and concentration plant, 60-mile branch railway, special loading facilities and a waterpower installation.

Congo Republic

Production figures for 1960 were: 80 kilograms of alluvial gold (113 kilograms in 1959); 7,660 tons of 55 percent lead concentrate (8,880 tons in 1959); 45 tons of cassiterite concentrate containing 75 percent tin (same figure as in 1959).

Prospecting showed evidence of the existence of a rather important deposit of potassium salts. Exploration for lead, zinc, and copper showed very favorable prospects.

Republic of the Congo

Mining continued at a high rate in the Republic of the Congo during the year despite political difficulties. In fact, Union Minière du Haut-Katanga raised production of copper, zinc concentrate, and germanium above 1959 levels. Relationship between the European and Congolese workers was most excellent and the entire force showed a professional consciousness and a high spirit of cooperation under the most difficult of conditions brought about by disturbances outside Katanga.

Increased copper output was mainly due to the start of the new 50,000 metric ton per year electrolytic copper section of the Luilu refinery. Design and operation of this plant proved a complete success, especially in regard to the automation features. Record output was made despite the voluntary cutback in the last quarter in order to achieve a closer balance between production and sales, as was done by other major world producers.

The decrease in uranium production resulted from the end of underground mining at the famed Shinkolobwe uranium mine. Surface stock piles were almost all treated at year's end.

There were no difficulties in transporting supplies to the mines and products to market. Electricity continued to be exported to the Northern Rhodesian Copperbelt from Union Minière's hydroelectric plants.

With lower production of copper-zinc ore from Prince Leopold (Kipusi) mine in the years ahead the company's long range expansion program proceeded on schedule. The second 50,000 ton annual electrolytic section at Luilu was scheduled for operation during the second quarter in 1961. In July the 3,500 annual ton cobalt section of the same refinery should be in operation. The new concentrator at the West-Kambove mine was scheduled for March operation.

In mid-1962 the mine and concentrator at Kakanda are to be in operation. The preliminary development of the new Kamoto underground mine is planned for 1963 with full scale production set for 1965. First ore will be milled in 1964 in the first section of the new 1,000,000 annual ton flotation mill.

Training and promotion of the African workers, which have always been a basic aspect of the company's policy, were actively continued in 1960. 70 training and finishing classes, attended by more than 1,000 workers, were organized. The purpose was to promote highly skilled African workers and foremen. Their school training in French and mathematics has been improved and their technical proficiency is broadened by the application of TWI methods. Other group programs were set up to prepare the gifted workers for their future promotion within the staff. 40 groups, totalling 363 Congolese, successfully followed these courses in 1960.

Union Minière du Haut-Katanga Production in Metric Tons for 1959 and 1960

Commodity	*1959*	*1960*
Copper	280,403	300,704
Cobalt	8,431	8,240
Zinc concentrate	118,000	192,000
Germanium[1]	13,643	26,100
Silver[1]	148,307	124,100
Uranium oxide	2,110	1,079
Cadmium	99	214

1. Kilograms

Diamond output was down slightly only because the first six months' production was at an all-time high rate at Bakwanga mines of Société Minière du Bécéka and the Kasai alluvial mines of the Forminière Company. The employees remained loyal to both companies and intermittent operations were forced by civil war between other groups.

Tin output from GEOMINES at Manono and gold from the Eastern Province was below 1959 levels.

Ghana

In 1960 when the World Bank guaranteed to produce £60,000,000, the Volta Dam scheme—the biggest single development project in Africa—came to life. The scheme is founded on the vast untouched bauxite deposits of Ashanti. The cost of building the aluminum smelter (another £100,000,000), using 200,000 kilowatts eight years after the dam contract has been awarded and 300,000 kilowatts eight years after that, will be borne by the aluminum company Consortium "Valco" (Volta Aluminium Company) headed by Kaiser Aluminum Company which is to put up $32,000,000. An important feature of this project is that the Ghana government has granted Valco exemption from all forms of import and export duty and taxes in dividends for 10 years. Also, tax rates are guaranteed

to remain on present levels for 30 years so far as Valco is concerned.

During 1960 also Ghana was busy denying that foreign-owned undertakings would be "taken-over" or "nationalized," but as far as the gold mining industry is concerned these denials proved to be misleading because early in 1961, the Ghana government took steps to buy-out five producers—Amalgamated Banket Areas, Ariston Gold Mines (1929), Bremang Gold Dredging Co., and Bibiani (1927)—which between them, produce about £56,000,000 worth of gold a year and have assets of nearly £10,000,000. This development is the result of new mining legislation which inter alia imposes heavy penalties (up to £100,000 and 10-year terms of imprisonment) on any management which discontinues mining operations for reasons other than the depletion of all workable ore-bodies making it permanently uneconomic to mine the deposits. Inflated costs, coupled with the government's denial of further aid for needy mines—£600,000 interest free loans had already been granted to Amalgamated Banket Areas and Bremang Gold Dredging in 1959—had previously resulted in Amalgamated Banket Areas and Bibiani deciding that closure was inevitable. Subsequently top level discussions have, however, resulted in the Ghana government making its bid. Not affected by this take-over are Ashanti Goldfields Corporation, Ghana Main Reef, and Konongo Gold Mines. These companies mine a higher-grade ore—particularly Ashanti which is still one of the richest gold mines in the world, its 1960 recovery being at the new record level of 355,600 ounces (321,366 in 1959) or 16.3 (15.8) dwt per ton resulting in a working profit of £1,773,304 (£1,628,851).

At 3,088,005 carats, diamond production in 1960 was slightly higher than in 1959 when the output was 3,041,633. The bulk of this was mined by Consolidated African Selection Trust by the most modern methods. This has resulted in considerable headway being made in order to keep pace with rising costs—which have increased by 147 percent between 1947 and 1957. Perhaps the most significant development during 1960, however, is that CASTS future diamond production in Ghana will be marketed through the Accra diamond dealers and not, as hitherto, through the De Beers Central Selling organization. This breakway is being enforced by the Ghana Government.

Bauxite output increased sharply from 162,147 tons in 1959 to 224,071 in 1960 and manganese production from 515,367 to 552,750 tons.

Ghana Mineral Production in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Bauxite	207,120	162,147	224,071
Manganese	513,099	515,367	552,750
Gold	851,433	902,595	580,619[1]
Silver	45,762	16,839	10,250
Diamonds	3,280,970	3,041,633	3,088,005

1. First eight months. 2. Metric tons. 3. Troy ounces. 4. Metric carats.

Kenya Mineral Production for 1957, 1958, 1959, and 1960

Mineral	*1957*	*1958*	*1959*	*1960*
Copper[1]	2,040	2,115	1,982	1,869
Diatomite[1]	3,373	4,229	5,608	3,384
Gold (refined)[2]	7,753	7,387	9,145	8,522
Graphite[1]	659	942	566	993
Kaolin[1]	1,185	1,140	1,145	1,035
Pumice[1]	773	2,071	2,249	2,419
Salt[1]	18,696	22,602	19,242	21,916
Silver[2]	44,146	23,051	46,420	33,865
Soda ash[1]	118,440	111,038	151,405	124,510
Vermiculite[1]	86	30	100	253

1. Long tons. 2. Fine ounces.

Kenya

Indications are that the total value of minerals produced in Kenya during 1960 will exceed £5,000,000 for the second year in succession, and will be of the order of £5,100,000. This is a decrease of approximately £200,000 compared with the 1959 all-time record figure of £5,319,355.

Small increases were recorded in the value of asbestos, kyanite, graphite, limestone products (other than for cement), meerschaum, raw crushed soda, salt, and vermiculite produced during the year; but decreases were recorded in the value of gold, silver, diatomite, pumice, mullite, magnesite, mica, and kaolin.

Resampling of the columbium-bearing prospect at Mrima Hill continued and was still in progress at the close of the year. The Kenya government is anxious to mine this deposit and work is being carried out to find the economic method of ore dressing.

During the year the Geological Survey Department geologically mapped a further 6,279 square miles bringing the total area so covered to 119,355 square miles.

Morocco

Morocco's phosphate mines continued their spectacular boom in 1960. The Kachkate (ex-Louis Gentil) and Khouribga mines made another record with 7,492,467 metric tons mined and 7,526,371 tons exported, compared to 7,163,502 and 7,026,702 tons respectively in 1959. The state-owned industry contributed 20 percent more francs to the equipment budget for economic development in 1960, out of profits, than in the year before.

Lead output forged ahead to 135,124 tons, zinc fell back to 82,268 tons, whereas the year before zinc output had jumped to 101,112 tons and lead was 131,996 tons. Exports of lead metal from the Oued el Heimer smelters was 31,685 tons (28,674 tons in 1959) and production of silver fell from 38,392 (1959) to 34,127 kilograms.

Manganese ore production stood fairly stable at 389,183 tons of metallurgical and 93,901 tons of chemical grade, the latter being about 6 percent higher than the year before. Exports were also stable at 76,922 tons of chemical grade of which most (51,900 tons) went to the United States, as usual.

The iron ore mines picked up considerably compared to the 1959 slump caused by marketing difficulties. Output returned to the 1958 level with 1,577,023 tons compared to 1,265,022 tons in 1959, while marketing snags seem to have been overcome too, since 1,896,454 tons were exported, a big improvement from 1959 when only 941,126 tons were exported. Of 1960's exports, 865,016 tons went to Britain.

The Bou Azzer du Graara cobalt mine bettered output by about 700 tons to reach a new high of 12,712 tons. For the first time exports included sales to Red China (3,985 tons), the remainder going to France (7,546 tons) and Belgium (2,713 tons).

Iron pyrite output was down to 13,438 tons. It is expected that the Kettara mines near Marrakesh will go into intensive production in 1961 to stockpile for the projected fertilizer acid plant planned for Safi.

Output of barite leaped ahead from 36,808 tons to 84,318 tons, mainly thanks to ready sales in the United States (34,543 tons), Holland (10,998 tons), and Britain (8,224 tons), among others.

Other ore output figures, with the 1959 figure in parentheses, were copper 5,020 tons (4,746), antimony 719 (573), tin 15 (16), and iron oxide 1,411 (2,107).

Labor disputes during the year, particularly in the phosphate mines, seemed to have no effect on output. The total labor force was increased by almost 2,000 men to reach 35,889 (including 758 in the oil fields).

Prospects for 1961 are generally excellent. Phosphate is expected to hit the 8,000,000-ton mark, cobalt should reach 15,000 tons, lead-zinc mines should advance 5 to 10 percent, and other major ore production should maintain its 1960 level of activity.

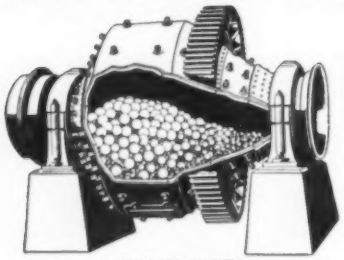
Mozambique

The most significant events of 1960 were in the geological rather than in the mineral production field. The Geology and Mines Department carried out valuable field work and initiated steps toward increased assistance to the mining industry. The field staff of the Department was increased during the year in preparation for stepping up the geological reconnaissance of the Province. The geological sheet of the area surrounding the capital, Lourenço Marques, was published and field work completed on an extensive area leading to the publication, it is hoped early in 1961, of six more geological sheets.

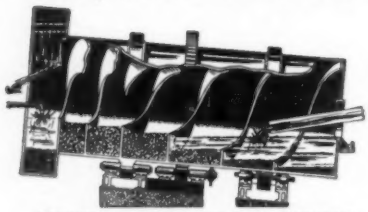
Another official body, Missão de Reconhecimento do Zambeze, carried out extensive investigations in the field of economic geology, using up to date methods including photogeologic mapping and reconnaissance by helicopter. As a result of this work, long known, but unprospected deposits of fluorspar, copper, chromite, gold, and possibly nickel and platinum, were evaluated in the Tete and Manica e Solfala districts. The work of the Missão seems to indicate that an extension of the Great Dike of Southern Rhodesia across the Zambezi River seems to exist. At least, similar formations are present. In addition, considerable work was done in the coal deposits of the Karroo Basin and on iron in Tete.

The geological survey and exploration of the concession held by Sociedade Mineira do Melela, Lda. in the Alto

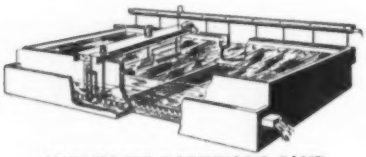
TIME-TESTED EQUIPMENT



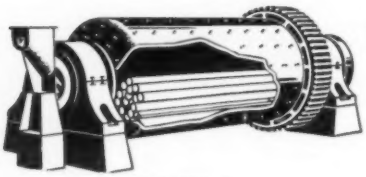
CONICAL MILLS



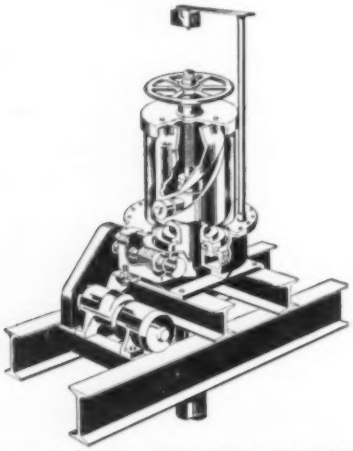
COUNTER-CURRENT CLASSIFIERS
HEAVY-MEDIA SEPARATORS



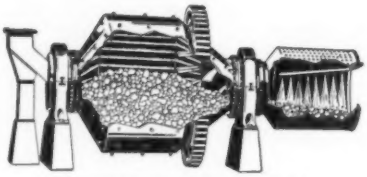
AUTOMATIC BACKWASH SAND FILTERS



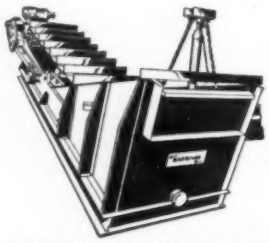
ROD MILLS



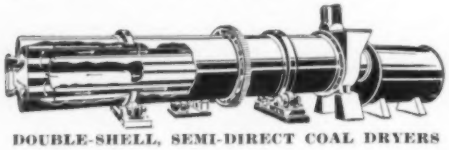
"AUTO-RAISE" THICKENER MECHANISMS



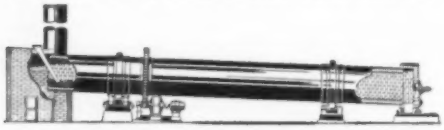
CONICAL ORE SCRUBBERS



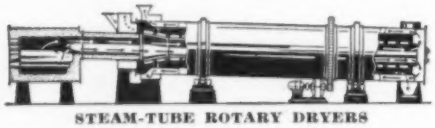
"OVERDRAIN" CLASSIFIERS



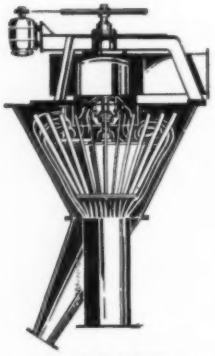
DOUBLE-SHELL, SEMI-DIRECT COAL DRYERS



HORIZONTAL ROTARY KILNS



STEAM-TUBE ROTARY DRYERS



"GYROTOR"
AIR CLASSIFIERS

HARDINGE
COMPANY, INCORPORATED
Main Office and Works • 240 Arch St., York, Pa.
"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
CHICAGO
HIBBING
SALT LAKE CITY
SAN FRANCISCO
HOUSTON
LAKELAND
BIRMINGHAM

Africa

Ligonha pegmatite field was completed during the year.

A new concession over an extensive area was awarded in the Alto Ligonha area, as well as some smaller concessions by the central government.

Mineral production continued at about the same level as 1959.

The contract between a group representing the Japanese steel industry and Anglo-American Corporation of South Africa, Ltd. to buy from the latter nearly 1,000,000 tons of iron ore per year from the Swaziland deposits has met with interest on the part of the government of Mozambique. Details are being worked out for the extension of the Goba railroad to the Swaziland border to permit the iron ore to be shipped to Japan through the harbor of Lourenço Marques.

Mineral Production in Mozambique in Kilograms for 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Asbestos	367,000	67,000	N.A.
Bauxite	3,962,673	4,284,000	4,459,000
Beryl	852,772	1,401,662	1,468,671
Bismuth	800	12,513	14,110
Columbite-tantalite	235,874	115,163	150,377
Mica	300	5,518	943
Tourmaline	936	337	13.7

N.A.—Not Available.

Nigeria

After 60 years of British rule, Nigeria became an independent State in 1960, but remains in the Commonwealth. It is significant that the transfer of power was carried out in an atmosphere that permeated nothing but goodwill from both sides. Small wonder, therefore, that mineral production has continued uninterupted and is thriving.

One aspect of Nigeria gaining her independence is that plans for the execution of a domestic tin smelter have been made by Consolidated Tin Smelters. Hitherto, and until such time as the smelter will be in operation, tin concentrates averaging 74 percent tin have been shipped under contract to a British firm (Williams Harvey & Co.).

The freeing of tin exports during the last quarter of 1960 in accordance with the ruling of the International Tin Council—to which Nigeria is bound by being a signatory to the original agreement—made it possible to step up production so that exports during the first eight months of 1960 were only about 6 percent short of the total shipments during the whole of 1959.

At the United Nations Conference on the new Tin Agreement, the Nigerian delegation successfully ensured freedom of restriction of the country's columbite production. This was achieved by allowing the country to carry additional stocks in the ratio of two tons of cassiterite for each ton of columbite mined.

Production of columbite also increased sharply mainly because of an improvement in demand. Producers made substantial forward contracts, and plans to expand production are well in hand, particularly at Odegi in Benue Province and also on the Plateau. One company has already sold one half of production for 1961, all at higher prices than any re-

ceived in 1959. In addition, it has sold half of its 1962 output at prices prevailing at the time of shipment. This price remained steady at approximately £650 per ton. Significantly a drilling program carried out by the Jantar Nigeria Co. Ltd. resulted in 4,000 tons of ore being proven plus 500 tons of possible primary columbite which compares with reserves of only 717 tons.

Gold production remained fairly constant. Prospecting under Special Exclusive Prospecting Licenses in Sokoto and Niger provinces continued, and in March a small suction dredge began operating in the Zanfara River. Results were disappointing, but it is intended to replace this dredge with a vertical suction type during the coming dry season in a more favorable locality. The gold production is absorbed internally where sales are made at a somewhat higher figure than the London Bullion market.

Exports of zircon during the first six months of 1960 amounted to 598 tons all of which were shipped to the United States, compared to 1,072 tons for the preceding six months. The value of Nigerian zircon lies in its high hafnium content.

Interest was shown in the numerous occurrences of barite for possible use for drilling muds for the Nigerian oil wells. A company, Nigerian Barite Ltd., was formed to prospect in the Benue Province.

Investigations were made of the low-grade occurrence of molybdenite at Kigom in the Zaria Province of northern Nigeria.

Lead-zinc production increased, but the development of the Abakaliki lead-zinc project was not started in view of the fact that Nigerian Lead-Zinc Co. Ltd. found it difficult to raise the necessary capital.

Nigerian Mineral Exports for 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*[1]
Tin[2]	7,626	7,536	7,133
Columbite[2]	737	1,882	2,186
Tungsten[2]	—	1	—
Lead[2]	780	1,208	664
Zinc[2]	—	—	339
Tantalite[2]	24	16	8

1. First eight months. 2. Metric tons.

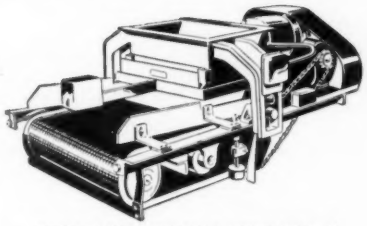
Northern Rhodesia

In spite of the 10 percent cut in copper production announced in October by both the Anglo American and Rhodesian Selection Trust Groups, metal and mineral production with a value of £128,700,000 set a new record, exceeding the 1959 figure by over £3,000,000. Copper output contributed £121,000,000 or nearly 95 percent of the new record total and was achieved by the sale of a 5 percent greater tonnage at lower average prices than those obtained the previous year.

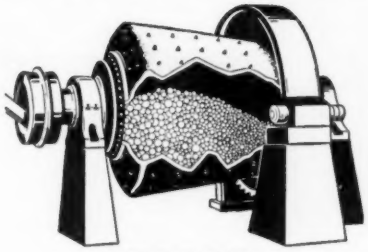
The year was free of industrial disturbances and a significant step forward was made when the European Mine Workers Union accepted a new plan for the advancement of Africans in the industry. Initially 350 Europeans will be replaced by Africans.

Throughout the year power was supplied to the Copperbelt by the Kariba and Le Marinel hydroelectric stations, the latter maintaining an uninterrupted sup-

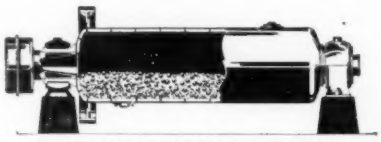
TIME-TESTED EQUIPMENT



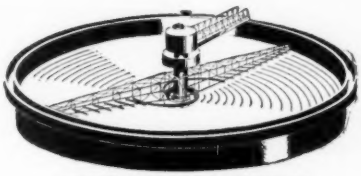
CONSTANT-WEIGHT FEEDERS ®



TRICONE MILLS

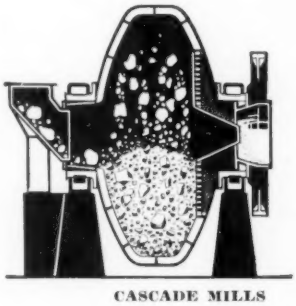


BALL AND PEBBLE TUBE MILLS

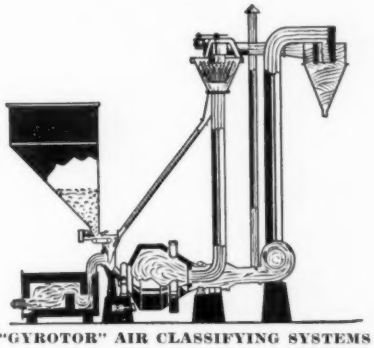


CENTER-PIER CLARIFIERS AND THICKENERS

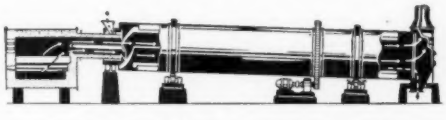
HYDRO-CLASSIFIERS



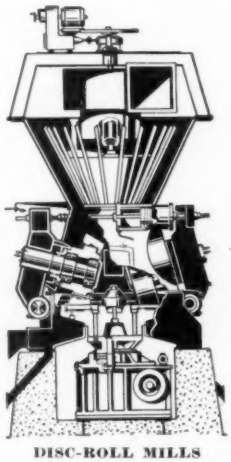
CASCADE MILLS



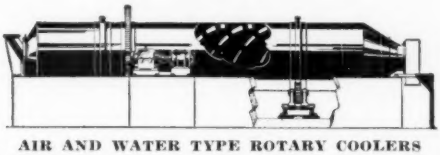
"GYROTOR" AIR CLASSIFYING SYSTEMS



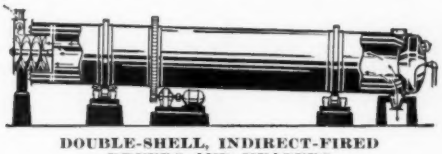
SINGLE-SHELL ORE AND CONCENTRATE ROTARY DRYERS



DISC-ROLL MILLS



AIR AND WATER TYPE ROTARY COOLERS



DOUBLE-SHELL, INDIRECT-FIRED DRYERS AND HEATERS

HARDINGE

COMPANY, INCORPORATED

Main Office and Works • 240 Arch St., York, Pa.

"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
CHICAGO
HIBBING
SALT LAKE CITY
SAN FRANCISCO
HOUSTON
LAKELAND
BIRMINGHAM

ply despite the conditions which prevailed in the former Belgian Congo.

Mufulira Copper Mines Ltd. continued work on the £16,000,000 Mufulira West project. During March and April a new Copperbelt shaft sinking record of 415 feet in 30 days was set by the Cementation Company at No. 14 shaft which is 18 feet in diameter and will be the main ore hoisting shaft for Mufulira West. The ore from this western expansion will increase Mufulira's tonnage by 50 percent, i.e., to 600,000 tons of ore per month. This will exceed Roan Antelope's tonnage and will give Mufulira the largest capacity on the Copperbelt. To handle the additional ore eight extra ball mills are being installed in the concentrator and by the end of the year all foundations were complete and work was commencing on the steel erection. All the extra ball mills will be operating by December 1961. Work has also started on a new tailing dam which will have a wall 17,500 feet long and up to 110 feet in height. The lake formed will be 4½ miles long and the dam will have a life of approximately 27 years. The only additional equipment required in the smelter is a converter and the installation of this unit was completed in October.

The Rhokana Corp. Ltd.'s smelter set a new monthly record in August with a copper production of 28,870 short tons. The cobalt plant changed over in March from hearth roasting to fluidized-bed roasting for the first stage of the recovery of cobalt and copper from its cobalt concentrate.

Roan Antelope Copper Mines completed the erection of the MacLaren shaft headgear and the installation of the service hoist. This shaft will be sunk to a depth of 3,900 feet and will provide ventilation and access to the western part of the Roan Extension ore body. Sinking below the footing commenced in June using a three-deck Galloway stage. Roan Antelope continues to mine and mill the highest tonnage on the Copperbelt and, to provide for additional tailing disposal capacity, work has commenced on the Chongo dam which will have a capacity of 56,000,000 tons. Consideration is being given to the integrated mining of the Roan Antelope and the adjoining Baluba copper-cobalt ore body.

Rhodesia Broken Hill Development Co. is going ahead with the installation of an Imperial Smelting Corporation furnace for the simultaneous production of lead and zinc.

Nchanga Consolidated Copper Mines, Ltd. set a new monthly record by mining 1,000,000 cubic yards of ore and waste from the Nchanga and Chingola open pits. Nchanga also set a world record when they drove 1,248 feet in a 14 by 14 foot haulage in 26 days, removing in the process 240,000 cubic feet of rock. Extensive modifications are being made in the concentrator with a change over from spiral classifiers to hydrocyclones in the grinding circuit, rearrangement of the flotation section flowsheet and the introduction of considerable instrumentation.

Bancroft Mines Ltd. commissioned a two-stage pumping system for pumping all the minus-3/16-inch ore from underground. The first stage consists of eight 8 by 8 inch Hydroseal pumps in series from the 1,317 foot level to the 650 level. The eight second stage pumps (also 8 by 8 inch Hydroseals) deliver the ore to surface. The system pumps 1,000 gallons per minute at 37 percent solids through an 8 inch pipeline. In the concentrator a system has been introduced for the automatic variation of xanthate addition in proportion to the ball mill feed tonnage. This automatic control will be extended to other reagents in the near future.

Chibuluma Mines Ltd. continued shaft sinking to gain access to the Chibuluma West ore body and by the end of the year the 16 foot diameter rock service shaft had been sunk to a depth of 873 feet below the collar. Consideration is being given to extending the shaft to the 1,265 level instead of the 1,050 foot level as previously planned.

Southern Rhodesia

Although 1960 was forecast as likely to be a year of political uncertainty in Southern Rhodesia, the findings of the Monckton Commission did not appear to have affected mining matters to any degree, though of course it is always possible that greater increases could have occurred. Nevertheless, the value of the mineral production went up a further 5.5 percent to over £26,000,000.

The statistics, in table, show significant increases in respect to copper, chrome, and tin, while the outputs of tungsten and mica were less. Lithium minerals have returned to their place in the official statistics from "other minerals," and there is recorded a first production of nephrite jade.

It will be noted that 11 Exclusive Prospecting Orders were taken out during the year, covering 638 square miles and involving expenditure by the holders of £217,000.

From the comparative statement of prospecting licenses issued (3,684, 3,240 in 1959): it is seen that there was a spurt in the search for precious metals, though the total number of blocks current at the year end was more or less unaltered. (2,889 for precious metals, 2,754 in 1959; 10,690 for base metals, 10,472 in 1959).

Asbestos: Only just maintained its place as the most valuable mineral export, though from the point of view of the country's welfare, gold is of considerably more importance since it employs much greater numbers of both Europeans and Africans.

Gold: A flurry of interest resulted from the increased price in October, and there were several old mines in the process of being reopened. The Government endeavored to further the effort by sending into the field two power-augering prospecting units as well as providing portable milling plants for prospectors. Five of these tractor-drawn and driven units, styled Gypsy Mills, will be available in early 1961. They have a throughput of 30 to 40 tons per day, and can be hired for £125 per month.

Chrome: The market continued in a depressed state and most of the smaller producers were being forced out. A technical officer was sent on a trade mission to Australia and Japan to investigate potential markets in those countries, the outcome of which may assist chrome miners in particular. It is also hoped that a second ferro-chrome plant will be started shortly.

Copper: Messina's smelter at the Alaska mine is in operation, thus producing copper in the country for the first time since the Falcon mine closed in 1918. When in full swing it is expected that some custom work will be undertaken, which will undoubtedly encourage the opening up of smaller copper properties.

Geology: A faculty of Geology was inaugurated at the University College of Rhodesia and Nyasaland, the chair being taken by Professor G. Bond. The appointment coincides with the 50th anniversary of the Geological Survey and, incidentally, the fact that technical grade posts in the Survey were open to Africans during the year.

Several Japanese Companies showed a real interest in the country's iron, nickel, lithium, mica, and tantalite deposits. Representatives of the Kobe Steel Works, in particular, carried out extensive drilling operations on hematite deposits near Que Que and it is believed that very promising results were obtained.

Outlook for 1961: Given a break in the political climate, Southern Rhodesia is

Metal and Mineral Production in Northern Rhodesia in 1958, 1959, and 1960 With Value in Rhodesian Pounds

Metal or Mineral	*1958*		*1959*		*1960**	
	Quantity	*Value £*	*Quantity*	*Value £*	*Quantity*	*Value £*
Gold[1]	3,673	44,777	4,735	58,219	5,667	67,189
Silver[1]	556,523	172,193	984,459	303,561	698,127	213,412
Cobalt metal[2]	20,950	1,877,120	22,817	1,791,215	19,212	1,193,551
Cobalt alloy[2]					1,413	32,808
Cobalt, other[2]	121,186	1,068,830	187,323	1,407,059	186,634	1,089,584
Copper blister[3]	133,423	23,191,913	165,543	34,945,876	161,903	33,439,660
Copper concentrate[3]	3,206	126,900	258	7,021	589	14,713
Copper electrolytic[3]	241,526	46,659,091	364,395	82,089,094	395,779	87,443,238
Copper, other[3]	706	125,844	1,254	266,248	1,177	243,290
Lead[3]	13,043	949,406	14,400	1,019,330	14,429	1,041,190
Manganese ore[2]	44,595	575,244	56,312	679,482	57,409	734,073
Selenium[4]	24,805	60,765	32,587	71,753	46,827	70,984
Zinc[3]	30,250	1,994,631	29,895	2,460,489	29,794	2,661,411
Uranium oxide[4]	101,080	——	76,567	——	——	——
Beryl[2]	11.44	1,418	1.79	214	2.235	268
Limestone[3]	409,017	353,859	477,866	427,812	360,245	456,509
Mica sheet[4]	1,940	485	253	127	530	265
Phylite[3]	23,694	3,554	21,986	3,298	10,545	1,582
Amethyst[4]	3,798	165	——	——	2	20
Cadmium[3]	17	19,132	——	——	29	28,978
Total value		**£77,225,327**		**£125,531,579**		**£128,732,770**

1. Fine ounces. 2. Hundredweights. 3. Long tons, 2,240 pounds. 4. Pounds. * Preliminary subject to adjustment.
NOTE: Copper values based on "F.O.R. at Mine" since 1959 approx. £22 below London Metal Exchange values previously used.

poised for a great industrial expansion, including mining. A marked advance was the adoption of new constitutions by employees' associations extending membership to all races. The disturbances that occurred in the three main centers during the year were largely due to unemployment, indirectly caused by the very considerable number of migrant workers coming in from Northern Rhodesia and Nyasaland. Steps were taken to curb this influx. It is noteworthy that no disturbances took place in the mines.

An increase in the price of gold can materially affect the overall situation, since there are hundreds of known occurrences sub-economic under present circumstances but which can be rehabilitated.

Southern Rhodesia Mineral Production in 1959 and 1960

Mineral	*1959*	*1960*
Gold[1]	566,883	562,703
Silver[1]	328,947	392,026
Antimony[2]	173	167
Arsenic[2]	528	204
Asbestos[2]	119,699	133,963
Beryl[2]	440	539
Chrome ore[2]	543,108	668,405
Copper metal[2]	12,017	15,128
Corundum[2]	2,799	3,845
Iron ore[2]	143,001	174,669
Iron pyrites[2]	45,066	55,214
Lithium minerals[2]	N.A.	87,845
Magnesite[2]	—	8,031
Manganese[2]	2,126	1,675
Mica, crude[2]	559	377
Phosphate[2]	1,877	3,850
Pollucite[2]	2	5
Tantalite, conc.[2]	58	54
Tin, conc.[2]	53	53
Tin, metal[2]	641	682

1. Fine ounces. 2. Short tons. N.A. Not available.

South West Africa

Tsumeb Corporation, Ltd., South West Africa's largest mining company, made continued progress in its plan for local smelting of all concentrates. The construction of the copper smelter proceeded on schedule and the smelter is expected to start operation before the end of 1962. A new lead smelter and refinery to treat all of the lead concentrate was authorized in July with construction scheduled to start in early 1961 with an operating target date in 1963. The new plant to produce semi-refined, high-grade germanium dioxide concentrates was placed in operation during the year with an annual capacity of 10,000 kilograms.

Underground shaft sinking reached a depth of 508 feet below the 30th level at year's end on the way to establishing a new 38th level, 4,184 feet below surface. Diamond drilling below the 30th level (3,650 feet below surface) hit ore at the 4,150-foot horizon. Assured and probable ore reserves to a depth of 3,650 feet were almost 11,000,000 tons.

For the fiscal year ended June 30, the mill treated 614,205 tons assaying 5.02 percent copper, 13.67 lead, and 5.30 zinc.

At year's end Tsumeb was building a 750-ton-per-day flotation mill to start operation in 1962 at the newly developed Asis mine 656 miles from Tsumeb. The 2,000,000 tons of ore so far developed average 3.6 percent copper, 4.4 lead, and 0.5 zinc.

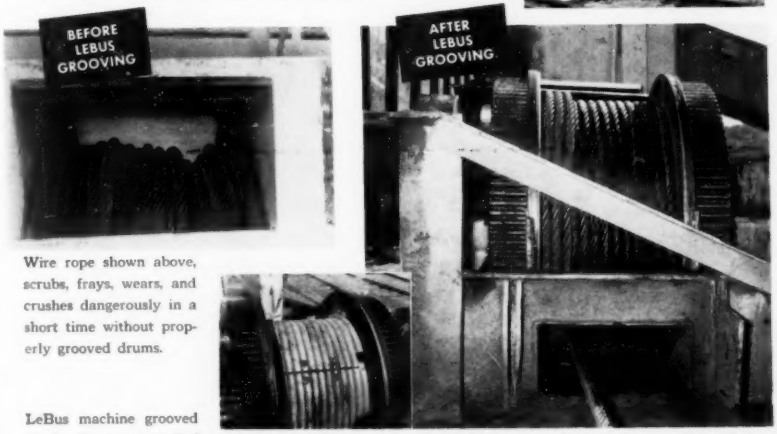
The new 42-inch gauge Usakos-to-Tsumeb railroad was commissioned with

Production of Important Metals and Minerals Produced in South West Africa in 1957, 1958, 1959, and 1960*

Commodity	*1957*	*1958*	*1959*	*1960*
Diamonds[1]	996,610	903,576	930,659[2]	935,404
Lead[3]	86,946	82,535	68,535	67,787
Copper[3]	29,835	30,818	33,773	21,480
Zinc[3]	62,000	44,728	21,586	26,932
Manganese ore[3]	89,661	103,050	49,442	67,440
Lithium ore[3]	6,743	8,973	5,197	5,042
Silver[4]	1,789,323	1,719,990	1,996,955	1,004,920
Tin conc.[3]	634	208	6	152
Cadmium[3]	1,420	1,344	647	866
Cesium ore, pollucite[5]	N.A.	67,260	54,000	N.A.
Beryl ore[3]	386	246	170	413
Germanium[3]	—	7	8	21
V_2O_5—Lead conc.[3]	505	524	N.A.	9,370

* Records of Government Mining Engineer. 1. Metric carats. 2. 819,352 carats gem stones. 3. Short tons. 4. Troy ounces. 5. Pounds. N.A. Not available.

WIRE ROPE LASTS SIX TIMES LONGER with LeBus Grooved Drums



Wire rope shown above, scrubs, frays, wears, and crushes dangerously in a short time without properly grooved drums.

LeBus machine grooved steel split sleeve applied to old retarder hoist drum.

LeBus Counterbalance Spooling was installed on the above car spotter winch or hoist retarder on August 21, 1960, and the customer has continually received a very satisfactory spooling operation. The same rope was on this drum until January 27, 1961, giving a total of six months use out of this rope where in the past it was necessary to change wire ropes normally every 30 days. This present rope had to be removed from the drum due to being damaged from being run over by a car and additional life could have been realized had it not been for this unfortunate accident.

This is another illustration of how LeBus Counterbalance Spooling can make your wire rope spooling operations more economical and safer. If more information should be desired regarding the results that can be obtained as outlined above, it will be furnished upon request.

See Exhibit Booth 141 Arena Coal Show May 15-18 Cleveland Ohio

Write today for details!

LEBUS INTERNATIONAL ENGINEERS, INC.

Box 2352, Longview, Texas • Phone PLaza 8-5522

Sales and Service Representatives

Fairmount Machinery Company, P. O. Box 992 Telephone 1672 Fairmount, West Virginia
Salman and Company, P. O. Box 2388 FAirfax 4-0625 Birmingham, Alabama
Western Machinery Company, P. O. Box 1498 CHapel 2-1983 Grand Junction, Colorado
Western Machinery Company, P. O. Box 2568 INgersoll 2-1983 Salt Lake City, Utah
The Coeur D'Alenes Co., P. O. Box 999, SK 2-1151 Wallace, Idaho
The W. B. Thompson Company, Iron Mountain, Michigan
E. E. McCoy & Sons, P. O. Box 644, Phone 375-4441 Grayville, Illinois
Garlick Sales & Service, P. O. Box 4834, Phone CE 5-2202 Oklahoma City, Oklahoma
Noble Equipment Company, P. O. Box 1381, Phone 234-1324 Casper, Wyoming
Longer Equipment Company, Hibbings, Minnesota
Coastal Engineering Company, P. O. Box 1618 Phone 7-7918 (Fairview) Bakersfield, California
R. D. Cloninger Warehouse, P. O. Box 1141 Phone CE 5-7826 Lafayette, Louisiana
Peck Sales & Service, 5806 Harvey Wilson Drive Phone WA 6-6225 Houston, Texas
Western Machinery Company, 2400 West 7th Avenue Phone TA 5-7151 Denver, Colorado
Western Machinery Company, 820 North 17th Street Phone AL 8-8531 Phoenix, Arizona

TROMBETTA SOLENOID CORP.

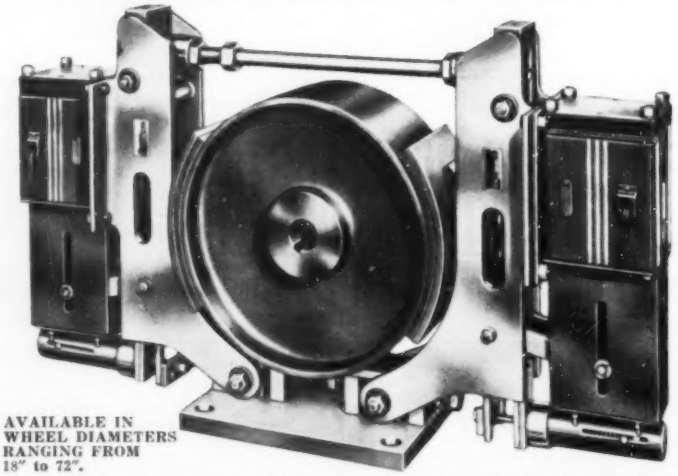
MILWAUKEE WISCONSIN
U.S.A

329 N. Milwaukee Street Phone BRoadway 1-8347

NEW DOUBLE-ACTION SOLENOID BRAKES!

from 1,400 ft. lbs. to 75,000 ft. lbs. capacity.

by **TROMBETTA** IN 1924 MR. TROMBETTA GAVE THE WORLD THE COMMERCIAL SOLENOID.



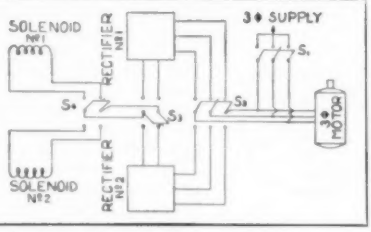
AVAILABLE IN WHEEL DIAMETERS RANGING FROM 18" to 72".

FAST OPERATION — NO MOVING PARTS WHEN BRAKE IS IN OPERATION. Laminated long stroke solenoids used in Trombetta brakes are fast operating, fast releasing. All difficulties resulting from slow operating torque motors and other make-shift operators completely eliminated. When operated on direct current there is nothing moving, and watt consumption is only about 40 watts for biggest brake.

LONGER PERIODS BETWEEN ADJUSTMENTS. Long stroke solenoids use only about 65% of stroke to release brake; other 35% for lining wear. Most durable lining is used — takes longest time to wear. Lining with most constant coefficient of friction gives uniform service.

NO DOWN TIME! NO DOWN TIME!! NO DOWN TIME!!! NO DOWN TIME!!!!
Trombetta Double Action Solenoid Brakes use two solenoids: one operates brake, the other is kept as spare. If one solenoid fails, the spare is put in use instantly. Failing unit can be replaced while brake is in operation.

Trombetta solenoid brakes are operated by either alternating or rectified current. When operated by rectified current, twin rectifiers are used, one to operate solenoid, other as a spare. Selective switches used to change from failing rectifier to good one, again eliminate down time.



Trombetta Theta line of brakes ranging from 3 ft. lbs. to 75,000 ft. lbs. are for alternating current, direct current (series or shunt); hydraulic or air operation.

Trombetta also manufactures solenoids for all requirements, and Reciprocators and Semotors. Write for Bulletin EE 222.

"TROMBETTA"

is the answer to all questions pertaining to:
SOLENOIDS, SOLENOID OPERATED BRAKES, RECIPROMOTORS, AND SEMOTORS

Africa

a resulting expansion of traffic capacity.

De Beers Consolidated Mines, Ltd., acquired diamond rights over an extensive Walvis Bay-Luderitz area from the Diamond Mining and Utility Company, which retained rights over the relatively smaller southern section. The De Beers company also continued small-scale operations in the Kaokoveld area. Consolidated Diamond Mines of South West Africa, Ltd.—which continues as the major producer of the larger, good quality gem diamond—reported no special developments, but continued prospecting to maintain reserves. The Industrial Diamonds Company was to purchase and commission a cutter-suction dredger for working a 12-mile diamondiferous terrace.

Further reports in 1960 tended to confirm the existence of an extensive copperbelt in the territory. Rand Mines, Ltd., and Rio Tinto Company entered the field of exploring for copper deposits; the latter company having advanced operations in the Windhoek-Okahandja-Onganga area, where rights were acquired, for exporting ore with eventual possible plans formulated to erect a concentrating plant.

Tanganyika

Once again Tanganyika set a new record. The value of its mineral production in 1960 topped the £7,200,000 mark showing an increase of some £200,000 over the 1959 figures.

Gold production has shown a steady increase over the last three years rising from 56,299 ounces valued at £705,000 in 1958 to a record of 98,024 valued at £1,200,000 in 1960.

Diamond exports showed a small decrease in quantity in 1960 compared with those of 1959, but their value was some £100,000 higher at £4,652,800.

An important item of news in the diamond mining industry was the announcement by the Tanganyika government of the termination on 1st January 1961 of the diamond prospecting monopoly held in the territory by Williamson Diamonds now jointly owned by the Tanganyika government and De Beers Consolidated Mines in equal holdings.

In Dar es Salaam the Legislative Council passed a bill dividing the territory into 24 blocks averaging 15,000 square miles each which will be thrown open to established mining companies. Williamson is to have prior choice of four blocks and its

Exports of Principal Minerals in Tanganyika in 1958, 1959, and 1960

Minerals	*1958*	*1959*	*1960*
Copper ore[1]	—	127.31	46.16
Diamonds[2]	515,453	554,670	536,668
Garnet[1]	—	181	133
Gold, refined[3]	56,299	85,403	98,024
Gypsum, raw[1]	9,153	6,758	4,350
Lead concentrate[4]	13,501	12,500	13,750
Lime[1]	495	138.86	235.70
Magnesian Bentonite[1]	77	35	98
Magnesite[1]	301	105	112
Meerschaum[1]	4.92	13.86	11.14
Mica, sheet[1]	48.47	51.78	80.17
Salt[4]	8,849	11,969	13,746
Silver, refined[3]	18,552	22,818	23,040
Tin concentrates[1]	26.20	93.21	196.93

1. Long tons. 2. Metric carats. 3. Ounces. 4. Metric tons.

decision is to be made by 1st July 1961. Companies may apply for more than one block, but they must undertake to spend £30,000 a year on each one.

The government has stated that it looks to mining companies to come to the territory to explore for diamonds and other minerals and to develop mines. The investment by these companies would be much welcomed and the government would not begrudge the companies a reasonable return for the risks they would undertake.

As expected the Mpanda mine of Uruwira Minerals Limited closed down during the year and its buildings, plant and equipment were all recently purchased by an East African subsidiary of a large British company specializing in this type of purchase.

The outlook for the mining industry in Tanganyika is full of promise and it is expected that steady increases will be made in the value of production as a result of continued exploration and further intensified international interest in what will shortly be a self-governing and later an independent country.

Union of South Africa

South African mining had another record year in 1960. Output of gold, diamonds, iron ore, chromite, manganese ore, fluorspar, kaolin, vermiculite, and vanadium set new records.

Gold mining expanded and reserves are available for mining well into the next century if the economic climate is right. The industry was not without its problems, and looked to increased mechanization to cut costs in the face of some shortages in skilled staffs, a decline in native labor force, rising taxes, high capitalization costs, and adverse conditions in the financial-investment climate.

The program of research was advanced particularly in automation, control equipment, and mechanization. Noted were the extension of automatic and semi-automatic hoisting; greater use of the Koepe winder—especially for deep-levels; extended use of the Blair stage-hoist; the installation of Blair multi-rope, multi-layer hoists at some mines; and use of light aluminum sections in man-cages to raise effective carrying capacities. Shaft-sinking technique was refined to shorten the pre-production period, mainly through intensified organizational efficiency; the use of larger, more efficient units; greater and more efficient mechanization. The world records at President Steyn and Hartebeestfontein testify to the advances made. In mining practice, longwall stoping methods were more widely applied—especially in the deeper Transvaal and Free State levels and in the higher grade sections. Peculiarly adapted to narrow stoping widths was the development of the Blair low-head stope-scraper.

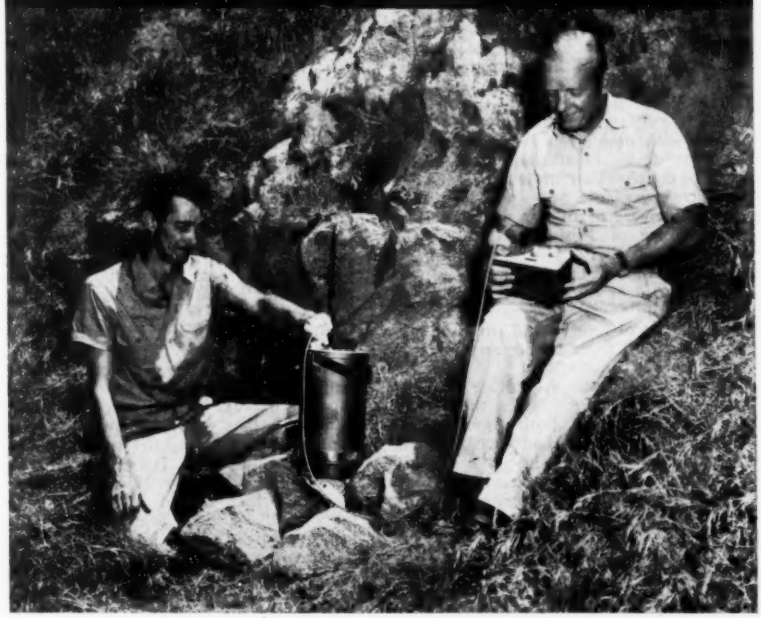
In metallurgical practice, automatic control systems were placed in new installations. The Union Corporation group extended use of immediate run-of-mine ore milling. The Stellar automatic filter was applied to clarifying pregnant filtrates and separating gold slime precipitate from barren solutions. In tests, solution tailing values were reduced 10 to 20 times to 0.001 dwt a ton of solution. Operational accent was on continuous flow requiring minimum administration and supervision; and in construction, extended use of concrete to reduce structural maintenance. The problem of pump abrasion received closer attention in the research program.

Four of the five developing gold mines should be in production by 1962. Gold exploration was widespread with the best discovery of the year reported as a new mine by Western Holdings Ltd. immediately south of the Western Reefs-Vaal Reefs Exploration and Mining Company, Ltd.-Buffelsfontein Gold Mining Company, Ltd. zone. Eastward and south of the old Rand interest continued to spread. Other key areas were the Ventersdorp-Coligny sector, west and east of Klerksdorp, the Kinross area, the Potchefstroom area, the Delmas-Bronkhorstspruit area, the Brits-Rustenburg area, and near the Libanon mine. In the Orange Free State the areas of interest were west of the Free State Geduld Mines Ltd. and southeast and south of Bothaville.

Sales of uranium oxide were extended from 1966 to 1970. In the decade from 1961 to 1970 a total of 22,397 tons will be supplied in the first six years to the Combined Development Agency (governments of the United States and the United Kingdom), and 5,953 tons in the last four years. Fixed selling prices will show little change.

Certain mines will suspend operations at the end of their current contracts. All but one of the companies largely dependent on uranium earnings will suspend operations in the near future or switch to gold production. Only five mines will be producers from 1967 to 1970.

BERYLLIUM ORE DETECTION MADE EASY



with NUCOR'S new "Berylometer"®

A new detection machine is now available to prospectors of Beryllium ore. The "Berylometer" can be used directly on outcroppings, boulders, and any other likely looking rock formations. Eliminates the old fashion time consuming method of chemical analysis.

"Berylometer" is portable, safe and self-powered and makes an efficient means of field analysis. Write for complete specifications and prices.

NUCOR

NUCLEAR CORPORATION OF AMERICA

Box 431 — Burbank, California

LATIN AMERICA

Argentina

Mining was steady but unspectacular during 1960. Although there was no outstanding news, the Argentine peso maintained a level of stability during the entire year which favored mining and commercial transactions. The established companies such as Compania Minera Aguilar (St. Joseph Lead) and Compania Minera Castano Viejo (National Lead) maintained normal production.

In the middle of the year two items of news attracted attention: asbestos in the Province of La Rioja, and iron in the Province of Misiones. The deposits of asbestos were examined by a technical representative of Rheinstahl Industrie Planung of Dusseldorf, West Germany, who, on his return to Buenos Aires, gave high praise to the deposits in question, and thought his company would be interested in investment and development. By the end of the year, though, no agreements had been reached. This is the same German group that signed a contract with YMAD (Yacimientos Agua de Dionisio) for further studies of the important Faralon Negro manganese-gold deposit. Exploration and development of this deposit in the Province of Catamarca are continuing with new levels being opened in order to develop sufficient tonnage to warrant construction of a concentration and recovery plant.

The discovery of an iron ore deposit in the province of Misiones in July was given wide publicity. The deposit, known as Tacuru, reportedly contains ore up to 40 Fe. The furor caused by the discovery made the provincial government declare the area a fiscal reserve and prohibit private companies from taking any interest without prior consent.

In early 1960 the Argentine government lifted the restrictions on the export of zinc concentrates. Both Aguilar and Castano Viejo, who had accumulated large quantities, took advantage of this new decree and exported heavily. In Argentina, regrettably, the smelters do not have the capacity to handle all zinc concentrates that Argentine mines produce. The free export of zinc concentrates thus increased mineral exports substantially for the year.

The quantity and U. S. dollar value of minerals exported during the first 10 months of 1960 compared with 1959 were: 1959, $2,600,000, 31,400 metric tons; 1960, $3,800,000, 49,500. For 1960, the figures include $1,170,000 for 23,500 metric tons of exported zinc concentrates.

The uranium industry in Argentina continued to progress during 1960. Uranium oxide reserves as of December 31, 1959, estimated by the National Commission on Atomic Energy, were 2,500 metric tons; but officials think the country has a potential of some 25,000 tons. By the end of June 1960, uranium oxide production totaled a little over 100 metric tons for the first six months of the year.

Steps to eventual development of the Sierra Grande iron deposits in southeastern Argentina continued. An agreement was signed between the West German firm Ferrostaal AG of Essen and a group of companies for the continued investigation and later development of these Patagonian deposits. The newly formed company—called MISIPA (Minera Siderurgica Patagonica)—consists of the following firms: Cia. Minera Alumine S. A.; Acindar (Industrias Argentinas del Acero); Semaca S. A.; Ecofisa S. A.; and the Trasmundo Company of the United States. Development is planned in two stages. The first will be more detailed drilling to increase the proven ore reserves from the present approximate 20,000,000 metric tons to an expected 80,000,000 metric tons. The second stage will be the construction of a large iron and steel complex utilizing natural gas fuel from the nearby Comodoro Rivadavia oil fields.

In Buenos Aires, COCOMINE (Commercial Committee for Minerals) determined export prices for minerals during the year, usually adopting the highest prices in the international market. Thus, beryllium ore was sold up to $35.00 a ton F.O.B. Buenos Aires, and tungsten ore up to $34.00 a ton. The tungsten industry was quite active during the year, partly because of the interest of the Compania Minera Auxiliar de Torrelavega of Spain in acquiring several tungsten properties.

Brazil

Expanding iron ore production in Brazil, which has approximately one-fifth of the world's total iron ore reserves, increased exports during the early months of 1960 to well over 50 percent more than in the same 1959 period. Exports are expected to increase about 600,000 metric tons annually after the Brazil Central Railroad adds new facilities to carry ore from the mines in the Paraopeba Valley of Minas Gerais. Vale do Rico Doce, the country's largest iron ore producer and exporter, continued its expansion to increase exports by 100 percent to reach 6,000,000 tons yearly, as well as plans for beneficiation facilities at its open-pit mine on Caue Peak, Itabira.

St. John d'el Rey Mining Company Ltd., in which the M. A. Hanna Company of the United States has a major interest, proved a large high-grade iron ore body at its Aguas Claras deposit near Belo Horizonte and then began a study of transportation facilities and other phases of development.

In order to concentrate on that project, St. John sold its gold mining property in Minas Gerais to a new Brazilian-controlled firm, but retained 25 percent interest and aided in financing a three-year expansion program. The property south of Belo Horizonte includes the Merro Velho and Espirito Santo mines, equipment, hydro-electric plants, railway and over 46,000 acres of land. St. John is Brazil's leading gold producer.

Two Canadian firms, Pato Consolidated Gold Dredging Ltd. and Placer Development Ltd., joined to form Exploração de Mineros Brasilia Limitada, which carried out exploration work in Minas Gerais and adjacent areas.

The Serro do Navio manganese mines of Industria e Comercio de Mineroi (ICOMI) near Macapa in the Amapa territory were expanded through aid of a $67,500,000 Export-Import Bank loan. The railway and the port facilities at Sant'Ana are also being improved. ICOMI was developed jointly by Auxiliar de Empresas de Mineração and Bethlehem Steel Company of the United States.

Manganese operations of United States Steel Corporation at Lafaiete, Minas Gerais, were suspended since output from these deposits is now reserved to supply Brazil's expanding steel industry. However, the United States firm is currently exporting manganese ore from mines of Sociedade Brasileira de Siderurgia S. A. (Chamma Brothers) at Urucum, Mato Grosso, through an agreement to purchase the ore and supply technical assistance and equipment for the Brazilian firm's operations. United States Steel has invested $3,500,000 in barges to carry the ore from Corumba to Rosario, Argentina.

In December, 1960, Fertilisantes de Minas Gerais S. A. (FERTISA) began production at its 150-ton-per-day superphosphate plant, based on reserves of 90,000,000 tons of phosphoric rock containing 20–35 percent P_2O_5. The apatite deposit is located at Barreiro de Araza, Minas Gerais.

Molybdenum Corporation of America and Wah Chang Corporation are building a mill for production of columbium concentrates in the same area. Initial plans called for an open-pit mine and a 200-ton capacity mill.

French and Brazilian interests combined to form Societé Morro do Niquel for the purpose of mining a nickel deposit in Minas Gerais.

British Guiana

During 1960 the increased world demand for bauxite made itself felt and the Demerara Bauxite Company produced 2,231,940 long dry tons and the Reynolds Metals Company produced 239,250 long dry tons, totalling 796,774 tons more than in 1959. The Demerara Bauxite Company is increasing its production of calcined bauxite. Exploration for bauxite was active during the year and Harvey Aluminum Company started prospecting once again on its holdings.

Diamond production rose again this year to 101,003 metric carats following a new discovery on the Ekereku River. This was all produced by small operators and is the highest production since 1930.

Only 2,364 ounces of gold were produced by small operators, as they have been concentrating on the new diamond areas. No dredges were in operation.

The Matthews Ridge manganese mine was developed to the production stage by Northwest Guiana Mining Company, a subsidiary of Union Carbide Corporation, and 66,068 long dry tons of ore were shipped to the stockpile in Trinidad, whence the ore is transferred to ocean-going ships. Production is expected to continue at the rate of 180,000 tons per year.

An intensive program of geological mapping is being continued by the Geological Survey, and wide new areas of aluminous laterite deposits were discovered in the Pakaraima Mountains. Private companies are also engaged in the assessment of reserves of aluminous laterite and very large tonnages have been proved.

Prospecting for gold and columbite

continued and experimental airborne magnetometer and scintillometer flights were made under the auspices of the Geological Survey.

Bolivia

Exports of tin, Bolivia's most important metal, dropped to 19,688 metric tons in 1960 compared with 23,981 in 1959. While the International Tin Agreement reduced exports in the first nine months, the entire decrease in production can not be blamed on this one factor. Other local conditions were more important during the year and included strikes in the mines which were almost universally settled by paying for time lost to the considerable financial loss to the Corporation Minera de Bolivia. Lack of tools, food, and repair parts as well as new equipment contributed to lower production. The government railroads were hard pressed and very slow in transporting concentrates out of Bolivia after they had been recovered in the mills.

The notable increase in gold exports, about 20,000 Troy ounces, was almost all placer gold from South American Gold and Platinum Company's connected bucket line dredge on the eastern slope of the Andes. This company produced about 38 percent of all gold. Mineria Chica (small miners) listed as the Banco Minero Bolivia accounted for 61 percent. This contained a large amount of placer gold.

Negotiations about loans for reequipment of the mines were started and it might be that the loans will be completed in 1961. So far no calculations have been published showing how the eventual loans can be repaid.

The German geological mission continued its investigations, but no reports about interesting new discoveries were published. It is known that in the provinces Nor and Sur Lipez interesting mineral deposits were investigated. These referred mainly to deposits of lead-zinc-silver ores which were being worked by the Spaniards in the Colonial days.

Japanese interests stayed active. They took over the Chacarilla property near the Chilean border on the La Paz-Arica railroad and started producing copper ore. Other Japanese groups showed interest in the well known Matilda zinc property.

South American Gold & Platinum Company continued its dredging operations through its subsidiary, South American Placers, rather successfuily. However, the dredge has not yet reached the richest deposits known near Teoponte. This company was also re-sampling the alluvial tin deposits of Ocuri.

Some well known scheelite deposits in the Conde Auqui district near Oruro were leased by Sonoma Quicksilver Mines, Inc. of San Francisco, California which started reequipping the ex-Juliana mine. This can be mentioned as the first United States investment in actual deep underground mining operations in Bolivia since the nationalization of the mines belonging to the three big mining companies (Patino Mines & Enterprises, Hoschild, and Aramayo). Negotiations for other properties were initiated, but not concluded at year's end.

Metric Tons of Metals and Minerals Exported From Bolivia in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*[1]
Tin	17,297	23,153	19,688
Lead	21,912	21,772	20,500
Zinc	14,222	3,393	4,300
Antimony	5,242	5,499	5,000
Copper	2,784	2,143	2,300
Tungsten	1,337	1,454	1,280
Bismuth	111	221	185
Silver	183	140	154
Gold[2]	19,179	35,364	55,000

1. Estimated. 2. Troy ounces.

Chile

For Chile, 1960 signaled the normalization of the major copper mining industry and the beginning of normalization for the iron mining industry.

Some new copper exploration was being carried out by The Anaconda Company's subsidiary Chile Exploration Company at the Andacolla deposit. Also, Tamaya, a wholly owned Chilean company, was conducting exploration near Andacolla in association with Mansfeld, A.G., a German firm.

The Chilean government began a crash program of mineral exploration jointly with the United Nations ECA and the United States Point 4 program. This is to be completed in mid-1962. It is supposed to coincide with a program of long term government loans to small and medium miners with some government directed industrial mining programs.

Little attention has been given to other than copper and iron mining however. The large copper producers are producing molybdenum as a byproduct but production of the so-called strategic minerals was almost at a standstill. Except for byproducts from copper, there is little production of gold and silver. The major zone for these metals in the Atacama province in north central Chile.

Lead mining is on the increase. The ENAMI (Empresa Nacional de la Mineria) produced 872 metric tons in 1960 and the Cia. Minera Aysen produced 1,959 tons of lead and 1,545 tons of zinc at its installation at Lago Buenos Aires in southern Chile.

Production of the major metals for 1960 was variable. Iron output had a slight increase to 4,500,000 tons due to the Japanese development of the Adrianitas mine near Copiapó. A further increase is expected for 1961 with the new program of iron purchasing by the ENAMI and the development of the large Algarrobo deposit. Cia. Acero del Pacifico mining of the Algarrobo deposit will not start until late 1962. However, a contract has been made with the Wells (Chile) Company to mine 600,000 tons by the end of 1961.

Copper production by the large producers decreased slightly in 1960 by 17,937 metric tons while the small and medium producers increased their overall production by 5,497 tons.

Export of Chilean copper and copper base products to the United States is on the increase. A normal increase of about 1.5 percent per year is current.

One of the most progressive Chilean mining companies which is destined to become a major producer of copper and at present is actually quite varied in its production is the Cia. Minera Tamaya. This company still remains one of the major producers of mercury in Latin America. The company produced 50,941 grams of gold, 99,146 kilograms of mercury, and 66.66 tons of copper at its Punitaqui mine; 1,026 tons of copper at the Tamaya mine; and 1,617 tons of copper at the Las Chivas mine.

The Aysen mines also produced 62,752 ounces of silver in 1960. Production of gold and silver by the Emp. Nacional de la Mineria for 1960 was 1,027,000 grams of gold and 13,302,000 grams of silver. The ENAMI exported 28,019 metric tons of fine copper.

Chile Copper Production in Metric Tons and Types in 1958, 1959, and 1960

Type	*1958*	*1959*	*1960*
MAJOR COPPER PRODUCERS			
Electrolytic	128,353	177,010	146,997
Refined	59,406	82,631	78,563
Blister	230,477	237,474	253,616
Sub Total	418,236	497,115	479,176
MEDIUM AND SMALL PRODUCERS			
Electrolytic	90	42	0
Blister	19,799	20,112	25,796
Minerals	2,230	1,707	1,459
Concentrates	21,359	21,241	21,518
Cement copper	3,161	4,618	4,444
Sub Total	46,639	47,720	53,217
Grand total	464,875	544,835	532,393

Colombia

Six dredges were operated during 1960 by South American Gold and Platinum Company, with production well ahead of predictions early in the year. The Colombian operations are conducted by two subsidiaries—Compania Minera Choco Pacifico which has four dredges producing gold and platinum in the Choco district, and Compania Minera de Narino, whose two dredges in the Narino district produce principally gold.

The firm's underground mine at Frontino started producing at the forecast level in the early months and output exceeded a like period in 1959 when a strike hampered operations. The operating firm, Frontino Gold Mines Ltd., contracted to sell Compania Quimica Industrial S. A. (QUIN) annually 40,000 tons of pyrite, a byproduct of the gold mining operations in Antioquia. QUIN is building a plant for production of superphosphate on the Magdalena River near Puerto Buerrio which will use the pyrite in manufacturing sulphuric acid.

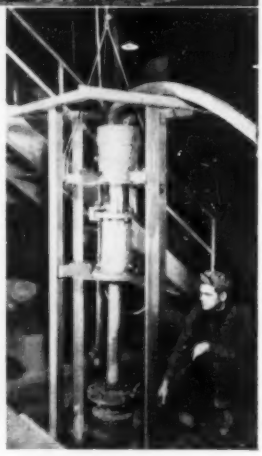
Pato Consolidated Gold Dredging Ltd. dredged 17,210 yards to recover 65,477 ounces of fine gold in the first three quarters of 1960, compared with 14,331,000 yards and 74,893 ounces for the same 1959 periods. Value per yard in the 1960 period was 13.31 cents; in 1950 it was 17.00 cents.

The Colombia Emerald Company (Empresa Colombiana de Esmeraldes) was organized during the year to operate the world's largest emerald mines, the Muzo and Cosquez, which were formerly operated by the Central Bank (Banco de la Republica) for the government. The new firm was financed partly by the government and by Colombian and foreign

NAGLE VERTICAL SHAFT PUMP

IS RIGGED FOR EASY INSPECTION

A Nagle 2" type "CWO-C" sump pump with abrasion resistant water end is doing a good job at New Jersey Zinc Co.'s Jefferson City, Tenn. Mill. Its function is to return flotation spills and filter vacuum pump water to the flotation circuit. Pump is mounted within a frame with guides for easy raising and lowering. Pump is shown raised. In service a year, no maintenance has been required. This is not unusual for a Nagle Pump—built for abusive applications exclusively. Send for Nagle Pump Selector.



Tough jobs call for

Nagle PUMPS

FOR ABUSIVE APPLICATIONS EXCLUSIVELY

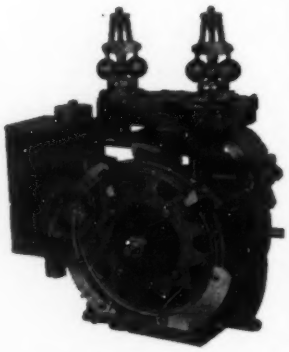
NAGLE PUMPS, INC.

1250 CENTER AVE., CHICAGO HEIGHTS, ILL.

Qualified Representatives in all mining areas

LILLY HOIST CONTROLLERS—FOR OVER A THIRD OF A CENTURY—The STANDARD SAFETY EQUIPMENT for MINE HOISTS

Be sure that your mine hoists are equipped with Lilly Controllers, to protect the lives of miners, and the hoisting equipment. Be sure that your controllers are carefully maintained and consult us for information and maintenance instructions.



Model C Lilly Controller

LOGAN ENGINEERING CO.

4901 West Lawrence Avenue
Chicago 30, Illinois, U.S.A.
Telephone PE 6-7500
Cable address "LOGANENG"

Latin America

private capital.

Acerias Paz del Rio, S. A., contracted with the Koppers Company, Inc. of the United States for management assistance in its Colombian operations. The del Rio firm has an integrated steel facility with an annual capacity of 125,000 metric tons. Its plant at Belencito includes a blast furnace, coke ovens, rolling mills and an 18-ton electric furnace. Raw materials—within a radius of 25 miles of the plant, limestone, iron ore, and coal—are mined which is 145 miles northeast of Bogota.

Metal and Mineral Production In Metric Tons in Colombia in 1958, 1959 and 1960

Commodity	*1958*	*1959*	*1960*
Sulphur	6,800	8,500	9,042
Barite	13,000	12,000	7,300
Kaolin	4,000	12,000[1]	20,000
Feldspar	4,000	10,000[1]	15,000
Iron	562,000	404,575	655,000
Mercury[2]	15,428	7,500[1]	6,760
Emeralds[3]	88,445	55,000	N.A.
Gold[4]	271,715	395,924	433,947
Silver[4]	105,162	102,678	134,331
Platinum	16,036	18,000[1]	21,960

1. Estimated. 2. Pounds. 3. Metric carats. 4. Troy ounces. N.A. Not available.

Honduras

Development of the Moramulca gold-silver prospect, the proposal to develop and mine magnetite on Quita Gana mountain, normal production at two silver-lead-zinc mines and passage of a new labor code highlighted 1960 mining in Honduras.

Utex Exploration Company (Charles Steen), Moab, Utah, continued exploring and developing the Moramulca gold-silver prospect 40 miles south of Tegucigalpa. The work consisted of drifting and sinking on strong quartz veins in andesite in an attempt to block out sufficient tonnage of gold-silver ore to justify the installation of a mill. At the same time, metallurgical studies have been made in an attempt to improve silver recovery, which is necessary if the present grade is to be considered as economically feasible for exploitation. About three more months of work are planned before a decision is made concerning the installation of a mill.

New York and Honduras Rosario Mining Company continued operation of its silver-lead-zinc Mochito mine on Lake Yohoa and Compania Minera Los Angeles (Paul Bundy) operated its Valle de Angeles silver-lead-zinc mine. Production was normal and at about the same rate as in 1959.

Standard Magnetite Corporation of New York and Honduras Mining & Development Company, Inc. of Dallas, Texas signed an agreement calling for Standard Magnetite to undertake development of an open pit iron mine on Quita Gana Mountain 104 miles northwest of Tegucigalpa.

The most important recent development was the passage of the new labor code which has been in operation for about a year. It is a very severe code and could seriously damage those mining operations that remain in the country, and most certainly will serve as a deterrent to any serious mining company contem-

plating operating in Honduras in the future.

There were the usual number of individuals interested in the gold placer country in the Department of Olancho, but as yet there has been no production from that area.

Mexico

The year 1960 was one of ups and downs for the Mexican mining industry. The usual struggle with prices and export quotas is probably the number one reason for the lack of new major mining developments. The industrialization boom and local refining of Mexican minerals instead of exporting ores and concentrates were the major objectives of the Mexican government during the year. Tax exemptions and other credits for minerals resulted in greater domestic mineral consumption.

Sulphur production continued to increase but the increase was very small, from 1,225,000 to 1,350,000 metric tons. In 1958 a production goal of 2,000,000 had been set for 1960. Unless new developments take place it will be several years before Mexican production will reach that goal. Azufrera Pan Americana, S. A., a subsidiary of American Sulphur Company continued to be the main producer.

One of the oldest mining districts in Mexico, El Oro and Tlalpujahua, suffered a severe blow with the shutting down of La Cooperativa Minera Dos Estrellas in August. Long one of Mexico's leading gold producers, the district reached its peak in the early 1920's and suffered a setback in 1926 and 1927 when most of companies then in the district suspended operations. Cía Minera Dos Estrellas acquired the properties and operated until 1938 when it turned over the properties to a workman's cooperative because they were no longer profitable.

Government agencies continued to play an important role in the mining industry. Comision de Fomento Minero increased its stock of equipment to aid the small miner, and at least twice as many small miners were given technical and material help in 1960 as in the previous year.

Mexico will have a new mining law in 1961. The new law was discussed by both Houses and several representatives of the mining industry in November and December 1960. The major change is the automatic tax exemption given those companies which are 51 percent Mexican owned. This will undoubtedly force the wholly or majority owned foreign companies to seek Mexican partners. Outside of giving control to Mexican capital the law does not hinder the investment of foreign capital in mines. It gives the decentralized government agencies now operating greater facilities to participate in mining operations.

Steel production increased as Fundidora de Fierro y Acero, de Monterrey invested approximately $80,000,000 in the expansion and modernization of its mill. Two 200-ton furnaces and several mills were added. Altos Hornos de Mexico acquired control of La Consolidada, the third producer in the country in January

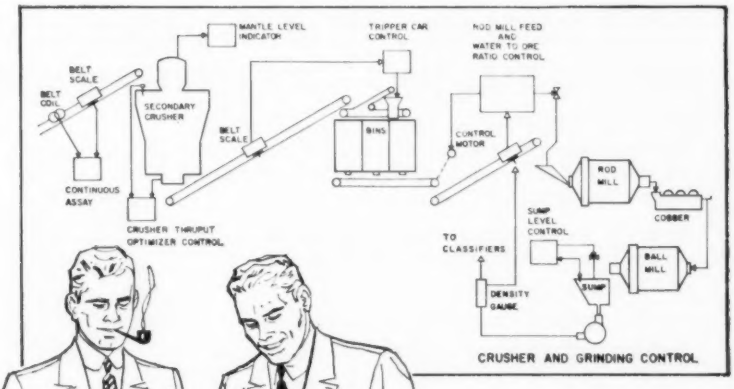
Mine Production of Metals and Minerals in Metric Tons in Mexico

Commodity	*1958*	*1959*	*1960*
Gold	11.096	11.012	10.890
Silver	1,716.015	1,495.500	1,295.000
Copper	77,066	74,450	75,500
Lead	238,167	174,900	181,500
Zinc	486,990	415,700	452,300
Iron	667,237	672,800	692,500
Manganese	98,194	100,230	96,300
Antimony	1,985	1,630	1,680
Mercury	1,225	825	801
Graphite	21,960	15,700	15,900
Tungsten	22	26	24
Arsenic	2,976	2,785	2,980
Sulphur	998,750	1,225,000	1,350,000

setting the "standard of performance"

for Ore Beneficiation Process Control

The Design, construction and installation of automatic control systems for the mining industry are the purposes and objectives of Ramsey Engineering Company. Founded with the express intention of serving industry in the field of automation, instrumentation and measurement systems, REC has organized a staff of engineers . . . industry oriented and experienced . . . familiar with ore beneficiation processes . . . cognizant of the environmental conditions which dictate operative design and construction . . . expert in packaging systems and equipment to meet individual needs and requirements. Through their efforts and accomplishments REC has developed several unique measuring devices and components which have made possible 'advanced' control systems with unparalleled accuracy and reliability . . . systems which have set a new high standard for performance in the mining industry.



CRUSHER AND GRINDING CONTROL

Ramsey engineers are at your disposal . . . to design, build and install an automatic system tailor-made for your operation. Write, wire or phone for consultation, recommendations and prices.

REC

RAMSEY ENGINEERING COMPANY

1853 W. COUNTY ROAD C
ST. PAUL 13, MINN.

1960. Altos Hornos produced 600,000 tons of steel, 500,000 tons in 1959. During early 1960 this company finished a 120-mile railroad from El Oro to La Perla in order to haul iron ore from the recently acquired mines of La Perla and La Negra. Altos Hornos is jointly owned by private enterprise and the government. Hojalata y Lamina, S.A. further expanded production by direct reduction of iron ores at its HyL plant.

The base metals held their own even in the light of heavy price fluctuations. Government assistance in the way of increased subsidies and greater domestic consumption was probably the biggest aid. Zincamex, S.A. was formed with joint participation of private enterprise and the government to produce 30,000 metric tons of high grade zinc per annum. An agreement was reached with S. A. Sybetra, Brussels, Belgium for the design and erection of the plant. Sybetra will participate in the ownership. The Anaconda Company's Mexican subsidiary, Compania Minera de Cananea S. A. de C. V., opened up a new low grade deposit in the Municipality of Piquito, Sonora. The mineral is chalcocite; ore assays 2.0 percent copper.

Peru

The mining industry moved to the forefront of the export activity of the Peruvian economy during 1960. For the first time mineral sales surpassed the value of agricultural shipment. Copper now heads the list of Peruvian export products and iron has moved up to the fourth place in this list, mainly as the result of the Toquepala and Acarí mines entering production. The exportation of the main mineral products: copper, iron, lead, zinc, and silver reached in 1960 the value of $200,000,000, approximately, which indicates an increase of 90 percent over 1959 figures.

Southern Peru Copper Company's new Toquepala mine started production on January 1st and the scheduled capacity of the mine and mill were reached in March. At the mine an average of 166,897 tons of ore and waste were mined per day. The mill treated an average of 26,-052 tons of 1.73 percent copper per day. Total blister copper production was 145,-115 tons.

The new contract signed between the Peruvian government and the Marcona Mining Company permitted this company to go ahead with an expansion program involving an expenditure of $22,000,000 for the construction of South America's first multi-circuit iron ore beneficiation plant, with an initial capacity of 2,000,-00 long tons of ore per year. Also building a new pier and ore handling equipment at San Nicolás Bay, 14 kilometers north of San Juan port and the linking of the new plant with the mining area by a belt conveyor system and a paved road. Iron ore reserves at Marcona have lately been placed as high as 600,000,000 tons. Also signed by the Peruvian government was a contract with an European group for the investment of $100,000,000 in the expansion of the steel industry at Chimbote whose production will be increased from the present 60,000 metric tons per year to 240,000 tons by 1963.

The Cerro de Pasco Corporation is investing $10,000,000 to increase the capacity of La Oroya zinc refinery and the Cerro de Pasco concentrator. Development of the McCune open pit at the Cerro de Pasco mine continued throughout the year. Development work was also carried out at the Cobriza copper mine in Huancavelica.

The Acarí iron mine, brought into production in 1959, shipped during 1961 over 1,500,000 tons of ore from port of San Juan. A 4-meter wide high grade hematite vein constitutes the main ore discovery made in this mine; preparations to mine this vein were completed and it is expected to yield about 1,000 tons of ore per day. Underground operations are being extended to take advantage of the marginal ore deposits which can be mined only by this method.

The South American Placers Inc. drilled over 100 churn-drill holes in the Inambari River area. First estimates on reserves are in the amounts of several hundred millions of dredgable cubic yards. Completion of drilling program on the Pachani River, one of Inabari's tributaries, yielded an average value of $1.06 per yard.

A group of gold-placer experts from

HERE IS ONE OF THE UNITS OF THE WAGNER MINING SCOOP AND TRUCK TEAM THAT HAS ESTABLISHED A NEW CONCEPT IN MINING OPERATIONS

Every worthwhile improvement that experience could recommend has been incorporated in the design and mechanism of this equipment. Only a few of the many outstanding features are listed below.

Both the scoop and truck use same model engine (facilitates interchangeability of parts).

4-wheel power steering.

Low-slung design (units are only 62" high).

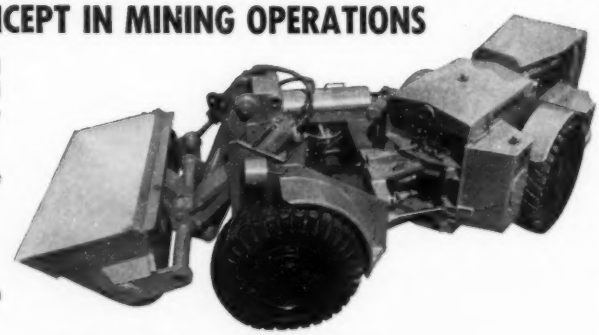
Exclusive center hinge coupling for high traction maneuverability and versatility.

Wagner planetary drive.

Full oscillation.

National Mine & Service approved exhaust scrubber.

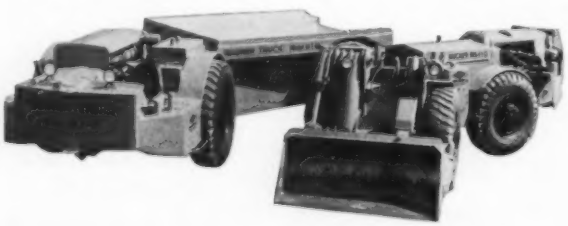
One inch solid steel plate used on many points of stress.



Rubber-tired speed and mobility.

One cubic yard roll-over bucket.

Lowest maintenance cost.



A WORKING PAIR

Coupled with the mining truck, the mining scoop can out-maneuver, out-speed and out-produce any competitive machine.

Other models available soon: 15-ton capacity truck and 23-ton capacity truck with telescoping bed and pusher blade to discharge load without raising bed.

WAGNER MINING SCOOP COMPANY

P.O. Box 7676 PORTLAND 20, OREGON

Alaska have been doing reconnaissance work in a number of gold concessions located in southeastern Peru. Results have been promising and they are planning to open an exploration office in Lima.

A number of large phosphate claims were denounced in the Sechura Desert by Compañía de Minerales Industriales del Perú. Approximately $500,000 was invested in exploration work on these beds of phosphatic rocks whose first estimate is of at least 100,000,000 and possibly 400,000,000 tons assaying 9.0 percent P_2O_5. Should the latter estimate be confirmed the Sechura phosphate deposit will be one of the largest in the world.

Fermín Málaga e Hijos, Peru's leading tungsten producer is producing 30 tons of 60 percent WO_3 per month. However, the company has increased its activities and is now producing 60 tons of copper concentrate per month.

The purchase option taken on the Chapi copper mine, located in Arequipa, by the Mitsui Bussan Kaisha Ltd. of Tokyo, was extended for a six-month period to permit the company to complete its exploration program which as far indicates 1,000,000 tons of 3.5 percent Cu. This Japanese company has also completed its preparations for an extensive drilling program that will be carried in the Cimarrón porphyry copper prospect, in the San José area of the same department.

The Bujama copper mine was sold to a group of prominent North American mining men established in Perú. A drilling program carried out by this group at Bujama proved the existence of copper sulfides in this property located in the Province of Cañete, in the Coastal Region of Perú.

The opportunity for future development in the metal manufacturing field lies in the prospects for establishing facilities for direct reduction of iron ore, zinc smelting and refining, and an aluminum smelter, once the Mantaro River electric power project is developed.

Venezuela

During 1960 the Direccion de Geologia of the Ministry of Mines and Hydrocarbons continued geological exploration of economic importance in various regions of the country. They also collaborated in a consulting capacity with various departments of the national government on metallurgical and petrochemical projects as well as the hydroelectric project on the Rio Caroni, State of Bolivar.

The prospecting for various minerals in Venezuela continued without interruption, and several new discoveries of possible importance were made based on aerial geophysical surveys. Greatest interest was given to iron-bearing minerals, tin, tungsten, monazite, tantalite, beryllium, and those minerals that have geological characteristics appropriate with faults, intrusions, dikes, etc. The national government also continued exploration and surveying of the national iron reserves by a program of seismic shots contracted to the company Laguna Perforaciones, C. A. Work was done on the Las Pailas and San Joaquin mountains in the State of Bolivar.

During the year the installation of a phosphate crushing plant in the State of Tachira was completed. The ground phosphate will be used as fertilizer for agricultural purposes. A new superphosphate plant being built by the Venezuelan Institute of Petrochemicals in Moran, State of Carabobo, is expected to be in production in 1961.

The government, through its Corporacion Venezolana de Fomento, signed a contract with Reynolds International for the construction of an aluminum complex called "Aluminio del Caroni, S. A.," with an initial capital of 50,000,000 Bolivars subscribed to in equal parts by both parties. The new company will be based in San Felix, State of Bolivar, and will utilize the hydro-electric potential of the Rio Caroni which surpasses 10,000,000 kilowatts. The present hydroelectric generating plant (Macague No. 1) produces 200,000 kilowatts but will be increased in 1961 to 300,000 kilowatts—six turbogenerators of 50,000 kilowatts each. The future aluminum plant is expected to have an annual capacity of 25,000 tons for the first years, but can be expanded to 50,000 tons at a later date.

During the year helicopters were used for the first time for geological exploration over the Guayana region. Since aluminum, nickel and manganese have special importance in the development of basic industries in the country, these three essential minerals have been declared part of the national "reserved zone," and exploration and exploitation is prohibited.

Early 1961 will see the conclusion of the geologic studies of the mercury deposits in the State of Lara, phosphate in the State of Tachira, manganese and iron in the State of Bolivar, nickel in the State of Aragua and Miranda, and coal in the State of Anzoategui and Tachira. Studies are also expected to be concluded on the lateritic deposits of the country.

The special organization that will have charge of everything connected with the development of the Guayana region will begin functioning in early 1961. The Corporacion Venezolana de Guayana is to: a) study the Guayana resources in and out of the development zone; b) survey and develop the Caroni river power potential; c) make plans for the development of the area as a whole; d) promote the industrial development of the area through government and private investments; e) coordinate the social and economic activities of government agencies; f) help organize public services. In anticipation of the Guayana region industrial growth, it is planned to build a large urban center for 200,000 people, between the Orinoco and Caroni rivers, to be called Guayana City.

Although a "reserved zone" for gold and diamond mining, the government granted seven mineral concessions during 1960 in the State of Bolivar: five for the mining of vein gold and two for mining alluvial diamonds. This was done to further promote economic development of the Guayana region.

The mining outlook for 1961 is for more exploration and government stimulation to all phases of the industry. Missions and study groups have been arriving and are continuing to be encouraged by the present government. The main focal point for development is the area north from the Coquimbo Province. This zone is regarded as being underdeveloped in spite of the large operating companies. Major power projects and road improvement programs are underway which will give a large boost to mining. In addition the government has granted some major tax concessions to all who enter into new mining activities within the next several years.

French Guiana

Studies undertaken on the development of the bauxite deposit were not concluded. Production of gold increased to 589 kilograms of fine gold, an output definitely higher than those of all previous years.

Peruvian Metal and Mineral Exports in Metric Tons for 1956, 1957, 1958, 1959, and 1960

Commodity	*1956*	*1957*	*1958*	*1959*	*1960*[1]
Iron	1,598,000	2,179,000	1,524,000	2,016,400	3,211,200
Zinc	143,700	150,000	136,500	156,000	156,000
Lead	118,000	120,000	135,000	115,000	124,000
Copper	43,500	49,000	52,400	49,000	157,000
Manganese	3,719	4,200	1,967	896	N.A.
Antimony	1,158	780	580	730	N.A.
Silver	656	684.4	776	835	915
Tungsten[2]	640	490	526	406	N.A.
Bismuth	302	340	352	262	N.A.
Cadmium	13	19	50	81	N.A.
Mercury	12.2	14	59.4	90.1	N.A.
Tin	2.1	12	15.5	56.7	N.A.
Gold	3.2	2.30	2.46	2.61	N.A.
Tellurium	.04	0	4.13	28.75	N.A.
Selenium	2.23	2.4	4.23	3.76	N.A.

1. Estimated 2. WO_3 N.A. Not Available.

Metal and Mineral Production in Venezuela in 1957, 1958, 1959, and 1960

Commodity	*1957*	*1958*	*1959*	*1960*
Asbestos[1]	7,611	8,303	4,622	3,932
Diamond[2]	122,598	89,565	94,985	70,867
Phosphate[3]	148,584	N.A.	N.A.	N.A.
Iron[1]	15,295,543	15,484,543	17,201,277	19,490,374
Manganese[1, 4]	29,882	8,200	11,937	N.A.
Nickel[1, 5]	1,487	2,002	1,348	697
Gold[6]	2,788,562	2,364,129	1,672,303	1,457,763
Pyrite[1, 7]	59,210	14,140	N.A.	N.A.

1. Metric tons. 2. Metric carats. 3. 30.3 percent P_2O_5. N.A. Not available. 4. 38.2 percent manganese. 5. 1.9 percent nickel. 6. Grams. 7. 25.0 percent sulphur and 2.2 copper.

ASIA

Ceylon

Graphite mining continued to be the principal mineral industry of the Island. The pattern of mining was the same as the previous year. However, there was a welcome increase in the exports during the year. A noteworthy feature is that United States firms which were the principal buyers of Ceylon graphite in the past have been superseded by both Japan and the United Kingdom. The 1960 exports to these countries being Japan—31 percent; United Kingdom—28 percent and United States—23 percent of the total exports for the year.

It is refreshing to note that in spite of the various difficulties facing the industry, the large mines are carrying through programs of modernization. One mine in particular is sinking and equipping one of its old shafts to reach the deeper levels.

The principal graphite mines continued to be worked by Bogala Graphite Ltd., Kahatagaha Mines Co., Ltd., and H. L. de Mel & Co., Ltd.

Gem stone mining continued as in the past. The estimated annual production of gem stones is valued at about R^{s}. 1,500,000. The principal varieties are the ruby, sapphire and its star varieties, cat's eye, topaz; zircon; aquamarine, and moonstone.

The plant for the treatment of beach sand concentrates continued to work throughout the year. About 330 tons of No. 1 quality monazite assaying over 98 percent rare earth oxides were produced during the year from the stockpile of No. 2 quality.

Ceylon Graphite Exports from 1951 through 1960 in Long Tons

Year	*Quantity*
1951	12,621
1952	7,659
1953	7,218
1954	7,755
1955	9,878
1956	9,207
1957	8,190
1958	5,637
1959	7,872
1960	9,024

Cyprus

Exports of iron pyrite during 1960 showed an increase of 156,000 tons over those of 1959, reflecting a strong demand by consumers in Western Europe and particularly Italy. On the other hand, exports of cupreous pyrite, cupreous concentrates, and copper cement were lower in volume but of a higher average unit value.

Cyprus Mines Corporation is entirely United States owned with a mines office at Skouriotissa, Nicosia, Cyprus.

Of the four mining leases only that of Mavrovouni was again operated in 1960.

Production from Mavrovouni mine was 792,941 dry long tons of ore as against 829,741 tons in 1959.

Mill production, during 1960, was as follows: Copper concentrates, 93,578 dry long tons; cement copper, 2,001, and cupreous pyrite, 174,319.

Gold in copper concentrates was 9,451 ounces, and silver in copper concentrates was 91,706 ounces; flotation pyrite concentrate was 455,336 dry long tons.

Hellenic Mining Co. Ltd. Production of marketable pyrite during 1960, from the three Mining Lease Areas operated by this company, was as follows: Mitsero-Agrokipia, 121,457 tons; Kalavassos-Asgata, 123,533 tons; and Kambia-Sha, 17,811 tons. A total of 262,801 tons.

The company's two ore beneficiation plants at Vassiliko and Mitsero were in full-time operation and shipments of ore continued to be made through the Vassiliko Bay loading installation. The second loading installation at Morphou Bay is due to operate early in 1961.

The company exported 144,751 tons of cupreous pyrites to Western Germany and 114,553 tons of iron pyrites to Italy, during the year under review.

An associate company, United Gypsum Limited, the sole exporters of gypsum rock from Cyprus, shipped some 107,000 tons in 1960 against 52,000 tons in 1959.

The company also holds prospecting permits covering 29 different areas in Cyprus and an extensive drilling program and other exploratory work are planned for 1961.

Cyprus Asbestos Mines Ltd. produced 20,818 short tons of fiber in 1960, as against 14,412 in 1959 and the quantity of ore treated was 1,781,122 tons in 1960 as against 1,443,314 tons in 1959.

Exports through the port of Limassol were mainly to Denmark, Sweden, United Kingdom, Austria, Eire, and Thailand.

The company's leased area is on Troodos mountains with plants and offices at Amiandos, in the same area.

Cyprus Sulphur & Copper Co. Ltd. is reported to have produced about 12,000 tons of copper concentrates as a by-product of flotation pyrites during 1960.

Cyprus Chrome Co. Ltd continued operating its mine on Troodos mountain and the concentration plant at nearby Ayios Nicolaos. Production during 1960 amounted to 2,520 tons of sized product, 6,100 tons of "sink and float" product, and 5,400 tons of concentrate.

Berdy Mining Co. Ltd. produced small quantities of bulk flotation pyrite from its plant at Troulli, treating ore mined from the nearby open pit.

Cyprus Mineral Exports for 1957 to 1960 in Long Tons

Mineral	*1957*	*1958*	*1959*	*1960*
Iron pyrite	762,501	819,835	659,370	815,410
Cupreous pyrite	226,334	228,821	307,026	248,931
Cupreous concentrate	139,192	115,125	123,519	115,784
Cement copper	3,900	4,068	3,693	2,212
Chromium ore	5,070	11,840	12,176	14,020
Asbestos	11,886	13,118	14,403	15,328
Gypsum rock	41,687	27,067	52,304	107,506
Gypsum calcined	1,257	2,722	1,538	2,144
Umbers	4,317	3,885	3,885	4,718
Bentonite	—	680	100	—

India

Iron ore production for India was at a record high in 1960. The first nine months' output exceeded the total year's production for 1959. Projected figures for lead-zinc concentrate production through September indicate a similar high rate. Iron ore production for that period in 1960 totalled 7,967,000 metric tons, 39 percent higher than in the same 1959 period, and greater than the total record 1959 output of 7,829,000 tons. Lead concentrate production totalled 5,128 metric tons and zinc concentrate 8,370 tons in the first three quarters of 1960.

Orissa was the chief producer of iron ore with Bihar, Mysore, Madhya Pradesh and Bombay the other leading states. Iron ore from the Thirthamalai area of Salem district, Madras, where reserves are estimated at 47,500,000 tons of mainly magnetite ore averaging 35 to 40 percent has been tested on a pilot scale, indicating it can be smelted with lignite, also in Madras, to make pig iron.

India has increased its commitments of iron ore to Japan, agreeing to supply 4,000,000 tons of ore yearly from an iron ore project in the Bastar district of Madhya Pradesh which Japan is helping to finance. Previous long-term contracts call for export of about 9,000,000 tons yearly to Japan.

Start of production at the three public steel plants, which have a combined annual output of 4,680,000 tons, and expansion of private plants added to domestic iron requirements. Increase in capacity of the privately-owned facilities —Tata, India, and Mysore iron and steel companies . . . provides another 2,400,000 tons of steel per year.

Construction on the multi-million dollar aluminum complex of Hindustan Aluminium Ltd. began last summer and is scheduled to start operation in 1962. A joint venture of the Birla interest of India and Kaiser Aluminum & Chemical Corporation of the United States, it is located in Utar Pradesh close to extensive bauxite deposits in the Vindhaya mountains in the adjoining state of Madhya Pradesh, and in the Lohardaga area of Bihar state. Indian Aluminium Company Ltd. started a $17,000,000 expansion of its reduction plant in Orissa state, doubling its primary ingot capacity to 22,400 tons per year. Bauxite occurrences in Salem district and part of the Nilgiris district have been under study.

Preparations for mining copper at Khetri in Rajasthan, where a smelter may be built eventually, were accelerated and deposits at Kolihan and Singhan were studied further. A mining and beneficiation plant producing 15,000 tons of metallurgical grade fluorspar yearly was proposed in the Durgapur district where reserves of some 5,000,000 tons of fluorite of 30 percent grade are estimated.

Three mines of the Kolar gold group were in operation, with production totaling 4,772,587 grams during 1959–1960. The national government is taking over operation of the mines, formerly managed by the Mysore state government.

Japan

Mining and metal refining industries enjoyed a busy year in 1960. This high level of activity is expected to extend into 1961. While tonnages treated and metal recovered were greater than in 1959 profits did not increase in most cases because of the lower unit metal prices.

Most of the gain in production was the result of greater imports of ores and concentrates for treatment within Japan as domestic production did not show any appreciable increases.

During 1960 the Japanese smelters imported substantial tonnages of foreign ores and concentrates for refining which enabled them to increase electrolytic copper output 28 percent over 1959, lead 16.4 percent, and zinc 13 percent. Metal content of imports was 102,957 metric tons of copper (73,249 in 1959); 27,956 of lead concentrate (23,954); and 49,958 of zinc concentrate (23,080). In addition to these concentrates 60,000 metric tons of electrolytic copper, 21,000 of pig lead, and 23,000 metric tons of slab zinc were imported.

Discoveries of several previously unknown ore bodies and expansion of mills and refineries were the highlights of mining in Japan. At year's end the Dowa Mining Company had blocked out, by continuous diamond drilling at its Kosaka mine (Uchinotai) in Akita Ken, more than 7,000,000 metric tons of ore assaying 2.9 percent copper. This ore also contains important zinc, silver, and barite as well as lead and a small amount of gold.

Mitsubishi Metal Mining Company has developed 2,060,000 metric tons of ore by drilling 60 holes to depths of 250 meters below the bottom level of its mine in the Furutobe district, Akita Ken.

This ore assaying 2.5 percent copper, 3.7 lead, 17.0 zinc, and 18 sulphur will be developed by sinking 250 meters below the current operating level. A new 7,000-metric-ton-per-month differential flotation mill will be built to treat this ore. At Mitsubishi's Ikuno copper-zinc-tin mine in Hyogo Ken, exploration added 100,000 metric tons of 1.5 percent tin and 4.5 percent copper ore. At the Akenobe copper-zinc-tin mine, also in Hyogo, 500,000 tons assaying 3.5 percent copper, 0.4 tin, and 5.0 zinc were discovered underground.

Sumitomo Metal Mining Co., Ltd., completed a new 200-ton-per-day cyanide mill at its Taio mine in November to treat 8.8 grams per ton gold ore. The company also operates a 100-ton cyanide plant at the Okuchi mine. At the company's Konomai gold mine in Hokkaido, Japan's largest gold mine, a promising silver-gold deposit was found underground in the Harutomi mine section. Ore reserve is estimated at 300,000 metric tons assaying 13.0 grams gold and 50 grams of silver per ton.

Nippon Seiko Mining Company, Ltd. also discovered a narrow vein with good values in gold and silver, but no announcement was made of any tonnage developed.

Mitsui Mining & Smelting Co., Ltd., decided to enlarge its Kamioka mine's lead smelter from 1,050 to 1,500 metric tons of electrolytic lead per month. Kamioka is Japan's largest zinc mine. At the company's Takehara smelter electrolytic lead refining capacity was raised from 300 to 450 metric tons per month.

Copper refining capacity was raised 2,880 metric tons per month in Japan from 19,550 to 22,430 metric tons per month in 1960. The refineries, owning companies, 1960 capacity (and 1959 capacity) are as follows: Hitachi, Nippon Mining Company, Ltd., 3,500 (2,600); Saganoseki, Nippon Mining Company, Ltd., 3,500 (3,100); Osaka, Mitsubishi Metal Mining Company, 3,600 (3,000); Takehara, Mitsui Mining & Smelting Company, Ltd., 2,800 (2,300); Nikko, Furukawa Electric Industry Co., Ltd., 3,000 (2,650); Annaka, Toho Aen Co., Ltd., 580 (500); and Okayama, Dowa Mining Company, 450 (400).

Production of Metals, Ores, and Concentrates in Japan in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
METALS			
Gold[1]	9,594	10,208	10,284
Silver[1]	259,766	294,793	322,766
Copper, electrolytic[2]	123,959	193,973	248,107
Lead, electrolytic[2]	41,520	64,312	74,194
Zinc[2], slab	140,978	164,910	186,547
Tin, electrolytic[2]	1,328	1,737	1,800
Quicksilver[2]	376	566	1,156
Nickel[2]	3,617	5,235	5,553
Cobalt[1]	—	18,927	17,768
Titanium[1]	1,656,052	2,476,646	2,306,000
Germanium[1]	4,882	11,974	21,362
Magnesium[2]	3,332	4,007	5,162
ORES (metal content of concentrates)			
Gold[1]	8,107	8,135	8,160
Silver[1]	203,791	206,867	213,679
Copper[2]	81,499	85,248	89,259
Lead[2]	36,694	36,148	39,820
Zinc[2]	142,973	142,337	156,513
Tin[2]	1,126	1,014	868
Antimony[2]	270	309	271
Quicksilver[2]	204	217	198
CONCENTRATES			
Pyrite ore[2]	3,358,590	3,389,805	3,681,223
Manganese dioxides[2] metallic[2]	12,504	12,720	14,495
	283,483	335,366	307,187
Chromite[2]	41,871	57,677	67,493
Tungsten[2]	683	921	856
Molybdenum[2]	591	719	732
Titanium[2]	5,331	5,143	4,926

1. Kilograms. 2. Metric tons.

Republic of Korea

Intensive geological investigations were made in Korea during 1960, notably for iron ore deposits, while work was done on gold, silver, copper, and lead. Following the completion of 18,000 line miles of airborne magnetometer surveys in 1959 which covered approximately two fifths of the country, the detailed ground surveys of 1960 discovered several previously unknown magnetite deposits. Joint investigation with United States engineers was conducted at over 100 gold, copper, and lead deposits in order to encourage mining. Exploration work at several of the most promising mines was started during the year. Within a short period more than $1,000,000 worth of gold reserves were indicated at the Kwangyan mine.

A mining equipment pool project was set up with the aid of ICA, on a somewhat similar plan to the former DMEA program in the United States. Under the pool plan $400,000 worth of mining equipment was available for use in mine development.

Korea Tungsten Mining Company operated its recently completed synthetic scheelite plant at the Sangdong mine to produce a high grade concentrate for export. Bismuth was a byproduct. The mine was developed in depth with ore continuing on the lower level. Mine ventilation was improved and sand filling was under study.

Production of major metals and minerals during 1960 was: gold, 2,047 kilograms; silver, 10,254 kilograms; iron ore, 393,000 metric tons of 53 percent grade; electrolytic copper, 1,008 metric tons; lead concentrate, 1,840 tons of 50 percent grade; tungsten concentrate, 4,920 tons of 65 percent WO_3; bismuth metal, 104 tons 99.5 percent pure; molybdenite concentrate, 83 tons assaying 90 percent MoS_2; amorphous graphite, 92,000 metric tons; fluorspar, 18,900 tons assaying 70 percent CaF_2.

Malaya

The two significant features of the mining industry in the Federation of Malaya in 1960 were the lifting on October 1 of the controls on exports of tin—thus control of overall production—and the upsurge in the output of iron ore to a record figure of 5,640,258 long tons.

Tin export control, under the terms of the International Tin Agreement, was in force from January 1 to September 30, Malaya being permitted to export a total of 42,071 tons. Operating in a free market for the last three months of the year, Malaya's tin producers exported 15,498 tons tin metal content, to bring total exports for 1960 to 57,467 tons. Mine production, however, during the year reached only 51,979 tons. The shortfall of 5,488 tons was met from mine stocks. By the year's end, these stocks had fallen to some 2,700 tons metal content.

This fall in production was indicative of the difficulties facing Malaya's tin mining industry, for although the increases in permitted exports in the January–October period gave producers the opportunity to restart the mines they had had to close down because of the cutback in exports, and as from October 1 they were free to do so, there were 132 fewer mines and dredges operating at the end of 1960 than when control was imposed in December 1957. In that year, mine production was 59,293 tons and total exports 59,655 tons.

The industry is faced with a growing shortage of mining land and is urgently in need of a Government land-use policy that will allow unrestricted prospecting and the release of ore-bearing ground to replace the deposits that are being worked out.

The Federation government announced that it would raise the export duty on tin on January 1, 1961. The increase may not seem excessive, being an additional M$2.28 when the price on the Singapore tin metal market reaches M$400 per picul (133.3 pounds) and above, but it reacts in particular against the smaller, or marginal miner—whose profit margin is low but whose output is an essential part of the country's overall production—and against the large-scale producer forced by circumstances beyond his control to work deposits of ever-diminishing grade.

Iron ore production of 5,640,258 tons in 1960 created a new record for Malaya. The previous year's output of 3,760,684 tons was also a record. This enormous increase in production was due mainly to the doubling of output by mines in the state of Perak during the year to a total of 1,336,692 tons—a phenomenal figure when it is realized that only seven years ago the state's single mine produced just 9,000 tons of ore. Perak was the country's second largest iron ore producing

Superior corrosion resistance with three new Johns-Manville Pipes

Epoxy-Lined Transite®

. . . for conveying aggressive process liquids.

- Excellent resistance to all salts in solution—both alkaline and acidic—and to most alkalies.
- Highly resistant to moderate concentration of organic, and to low concentrations of inorganic, acids.
- Full range of pressure pipe classes up to 200 psi.
- Full range of non-pressure (gravity) pipe with strength classes through 5,000 lbs. (ASTM 3-edge bearing method.)
- Available in diameters of 6″ through 36″.
- Excellent flow characteristics.

Chemtite® Pipe

. . . the most economical corrosion-resistant piping available for hot processing lines.

- Rated for use up to 150 psi systems. Rated temperatures up to 300 F.
- Resistant to acids, salts, gases and solvents.
- Homogeneous wall . . . no wall liners.
- Can be cut and field-threaded with standard tools.
- Can be steam-cleaned.
- Can be joined by adhesive bonding. Comes in 1″ through 6″ diameters.
- Asbestos-reinforced thermosetting resin product with excellent flow characteristics.

New ABS* Plastic Pipe

. . . ideal for use in transporting industrial chemicals, natural gases, irrigation water, salt water and sour crude.

- Exceptional corrosion resistance.
- Low friction loss.
- Free from electrolytic action.
- Pressure rated up to 140 F.
- Semi-rigid thermoplastic pipe.
- Comes in ½″ through 3″ diameters.

**acrylonitrile-butadiene-styrene*

JOHNS MANVILLE PRODUCTS JM

JOHNS-MANVILLE

state. Trengganu remains the largest producer; output in 1960 was 2,650,260 tons.

At the end of the year there were 24 iron mines—in Johore, Kedah, Kelantan, Perak and Trengganu—employing 6,594 workers. In 1961, as in 1960, Japan's growing demand for iron ore will stimulate production and it is likely that another output record will be established. During 1960, 5,500,396 tons of iron ore worth M$140,229,372 were exported.

Production of gold in Malaya in 1960 was 6,000 troy ounces less than in 1959 at 20,745, although it should be noted that production in 1959 was the highest since 1940.

The Johore bauxite mines produced a total of 451,958 tons in 1960; 381,747 tons the previous year. China clay production was slightly down at 1,223 tons, as also was columbite (93 tons).

Manganese mining was started in Kelantan in October and by the end of the year output had reached 2,877 tons.

Production of Metals and Minerals in Long Tons in Malaya in 1957, 1958, 1959 and 1960

Commodity	*1957*	*1958*	*1959*	*1960*
Tin	59,293	38,458	37,525	51,979
Iron ore	2,972,359	2,795,261	3,760,684	5,640,258
Illmenite	91,734	74,827	72,851	118,242[1]
Monazite	490	428	236	42[1]
Tungsten	50	44	20	36
Columbite	142	159	120	93
Bauxite	325,629	262,354	381,747	451,958
Gold[1]	11,157	22,484	26,739	20,745
China Clay	1,510	1,200	1,282	1,223

1. Exports. 2. Troy ounces.

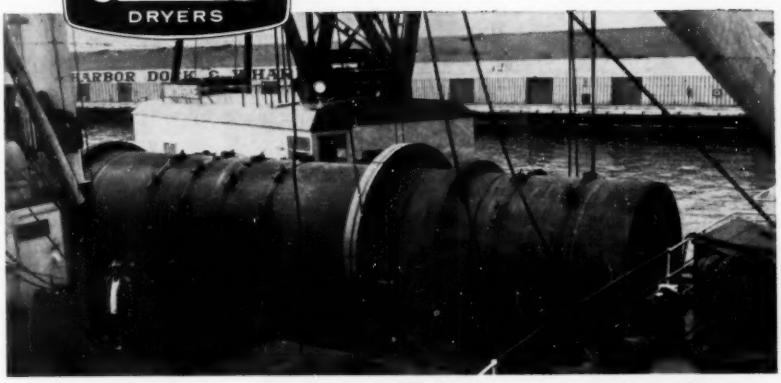
Turkey

Establishment of a second steel making center in Turkey moved closer to realization in 1960 with the creation of the Eregli Iron and Steel Works as a private company with joint ownership by Turkish industrialists and an American group consisting of Koppers Corporation, Blaw-Knox Company and Westinghouse Electric Company. Although the Turkish government is also participating in the venture, majority rights are held by the private participants.

The second steel center sparked an increase in iron ore exploration activity by government and private interests in an effort to locate a suitable ore body of sufficient size to be the primary source of raw material. The Mineral Research and Exploration Institute, Turkish Government Mineral Agency, carried out extensive drilling activities on the Hekimhan West property of Bilgen Mining Company, a private firm, and proved 5,000,000 tons of 58 percent iron ore. This is somewhat less than anticipated, based on preliminary estimates, but is in addition to the 12,000,000 tons of 50 percent Fe ore proven at the Hekimhan East property in 1959. The latter also contains 5 percent manganese.

MTA also commenced a drilling program at the Ozkoyuncu mine south of Kayseri and will continue its program in 1961. Other drilling programs are slated in 1961 by MTA. At present there are about 80,000,000 tons of proven iron ore in Turkey in scattered locations, including the state-owned Divrigi mine which sup-

STANDARD DRYERS



Huge Dryer Goes To Chile Exploration Co.

Shown loading for transport to South America and the world's largest open pit copper operation, this 52-ton STANDARD Rotary Dryer will be used to process copper concentrates at the Chuquicamata mine of the Chile Exploration Co., a subsidiary of The Anaconda Company.

The 10-ft. by 60-ft. dryer is a parallel flow, direct-fired type, designed and built in the STANDARD Los Angeles plant.

STANDARD builds dryers, kilns, coolers and calciners big and small—all of them designed for maximum efficiency. **SEND FOR CATALOG.**

Contact your nearest STANDARD plant for advice when you explore rotary processing equipment. STANDARD is the world leader.

STANDARD STEEL CORPORATION

General Office & Plant: 5031 Boyle Avenue, Los Angeles 58, California

Eastern Division—Office & Plant: **CAMBRIDGE DIVISION,** Lowell 31, Mass.

Midwest Division—Office & Plant: **LEADER IRON WORKS,** Decatur 31, Ill.

ROTARY DRYERS • KILNS • COOLERS • ASPHALT PLANTS • CRYOGENICS

Wherever Ore Moves, SCOOT-CRETE

Ore Carriers Move It • FASTER • EASIER • AT LOWER COST

SCOOT-CRETE CD-4, shown being loaded in mine, will carry up to 15 tons payload. Model CD-3N has 5-ton payload. Note driver's side-mounted position for maximum vision and efficiency, forward and rear.

Throughout the world, SCOOT-CRETE gives top-rate performance. No rails needed, no ties, no cars, no independent power source. Diesel-powered for operation inside the mine, SCOOT-CRETE carriers are rugged for around-the-clock service; carry up to 15 tons at speeds to 15 mph, climb grades up to 18%. Available with standard or fully automatic transmission. SCOOT-CRETE has equal speeds forward and reverse for fast shuttle service.

ALL CD MODELS APPROVED BY U.S. BUREAU OF MINES FOR UNDERGROUND MINING.

Units available from 3,000 lb. to 15-ton capacity. Write for specifications and literature. See your Dealer.

GETMAN BROTHERS SOUTH HAVEN, ZONE 5, MICHIGAN

Mineral Production in Turkey in Metric Tons From 1956 to 1960[1]

Commodity	*1956*	*1957*	*1958*	*1959*	*1960[4]*
Chromite production	833,073	914,178	520,901	387,662	539,855
Chromite, exports	642,009	571,122	516,004	305,881	355,000[2]
Copper, blister	24,763	24,401	22,500	25,036	26,538
Boron minerals	33,477	27,388	69,402	73,336	80,000[2]
Lead ore	10,890	8,102	5,899	4,175	3,000[2]
Iron ore	930,480	1,164,199	950,908	872,889	753,033
Manganese	60,751	56,719	22,607	35,690	39,469
Mercury[3]	1,079	720	1,486	553	1,110[2]
Antimony, conc.	6,625	1,863	856	1,302	780[2]
Zinc	3,528	6,871	6,773	4,038	4,200[2]
Sulphur	13,901	13,100	12,825	13,385	17,117

1. From Monthly Bulletin of Statistics, Central Statistical Office, Ankara. 2. Estimated. 3. Flasks. 4. Provisional, subject to correction.

SHAPE DOES IT
THE Better Block
There's a
ROPE MASTER
MINING BLOCK
for every requirement
Appearance alone stamps ROPE MASTER as a block that is different, and its many plus features have made it the block most in demand. Our continued program of product improvement guarantees the best by comparison.
The streamlined sides and ideal balance give faster positive pick-up under the slightest load — eliminate fouling and hangups — give longer life to wire rope and blocks — make the use of larger blocks practical.
Write for catalog.
PAUL E. KEENEY CO.
1125 S.E. GRAND AVE.
PORTLAND 14, OREGON
ROPE MASTER MINING BLOCKS ARE AVAILABLE WITH THESE FITTINGS
SWIVEL HOOK
YOKE TYPE SWIVEL SHACKLE
PLAIN SHACKLE
FLAT SHACKLE
SWIVEL SHACKLE
SAFETY SWIVEL HOOK
SNATCH LOCK

plies the Karabuk steel mill.

Iron ore production fell off by 120,000 tons in 1961 despite an increase in iron ore exports from 133,368 tons in 1959 to 305,843 tons in 1960. This 130 percent increase in exports is attributed to the re-establishment by the Turkish government in May, 1959 of its former policy of permitting export of iron ore for processing abroad and return of countervalue in finished products. Most of the decrease in production occurred at the State-owned Divrigi mine where output was 390,680 tons in 1960 as compared to 468,457 tons in 1959. This is attributed to a decrease in demand for raw material at the Karabuk steel mill where operations have been somewhat disrupted due to construction of a new blast furnace, coke ovens, and other facilities in connection with its expansion program.

Chrome ore production increased to 539,855 tons in 1960 from 386,662 tons in 1959 reflecting the increase in export premium from TL 4.9 per $1.00 to TL 9.0 to $1.00 granted in May, 1959. This improved Turkey's competitive position in the world market. The increase in production was accompanied by an increase in exports from 305,881 tons in 1959 to an estimated 355,000 tons in 1960. Exports were higher despite a noticeable decrease in demand in the latter half of 1960 from European customers and generally depressed world market conditions for chrome ore. Port stocks were about 200,000 tons at the end of the year.

Increased interest is being shown in Turkey in the upgrading of lower-grade chrome ores through beneficiation in order to improve exports and increase foreign exchange earnings. Koycegiz Chrome Operations, Ltd., obtained a credit of $180,000 from the United States Development Loan Fund to erect a 150-ton an hour chrome mill in the Fethiye district. At least two other mills are in the proposed stage. There are six chrome mills presently operating in Turkey.

Blister copper output increased from 25,036 tons in 1959 to 26,538 tons in 1960. All production is from the two state owned mines at Ergani and Murgul. Plans are moving forward for the development of a 12,000,000 ton body of lower grade, disseminated ore (2.54 percent) at Ergani to replace the nearly exhausted high grade (plus-7-percent) suphide ore body which has been mined for nearly 25 years. Development was being financed with a $1,500,000 Export-Import Bank loan.

Production of boracite increased slightly in 1960. Exports continue at the same level as 1959. Interest continued to be shown by European and American interests in building a borax refinery in Turkey and at least one firm proposal has been submitted and is pending. Production by Etibank at its Emet property, the largest known in Turkey, was 11,029 tons in 1960, as compared to 6,916 tons in 1959.

Sulphur production increased substantially at Etibank's Keciborlu sulphur mine in 1960. Output was 17,117 tons of refined sulphur in 1960 as compared to 13,385 tons in 1959. Production is now in excess of internal requirements of Turkey and a surplus of over 12,000 tons was available for export. Etibank seeks a market for this surplus.

Manganese production increased from

35,690 tons in 1959 to 39,469 tons in 1960, all from private mines. Production is still considerably below the output of earlier years, however.

Taiwan

Production of the important ores and minerals in Taiwan showed a steady increase in 1960 as compared with the previous years. Sulphur and pyrite are the only two mineral commodities whose output dropped slightly due to high production cost and the import of cheaper sulphur ores from foreign sources. However, the flotation process was used in the local sulphur mines attempting to concentrate low-grade into high-grade ores. This treatment met with considerable success. It is hoped that at least a part of the imported sulphur ores can be replaced by locally produced high-grade ores in 1961.

Coal production reached 3.9 million metric tons in 1960 and is 200,000 metric tons more than the anticipated figure.

Gold and copper production remained at an increasing level. Sand filling mining system has been practiced in the Chinkuashih mine, the largest metal mine in Taiwan, to increase ore production. The No. 8 adit in that mine has been completed and is ready for production.

Not much change will be expected in most of the mining fields in 1961. The production of many minerals will be much the same with a marginal increase in 1961 as compared with 1960. Those minerals which showed increasing production in 1960 will continue this upward trend in 1961 and the years to come.

Production of Minerals in Taiwan in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Coal[1]	3,181,418	3,563,131	3,930,491
Sulphur[1]	6,508	6,800	5,163
Pyrite[1]	33,276	35,052	42,944
Gold[2]	630,300	459,100	535,200
Silver[2]	1,609,500	1,939,100	1,706,400
Copper, electrolytic[1]	1,663	3,303	3,558
Magnetite sand[1]	9,670	11,190	13,327
Talc[1]	3,336	4,593	10,557
Graphite[1]	451	300	300
Asbestos[1]	43	136	440
Gypsum[1]	11,104	10,443	10,478

1. Metric tons. 2. Grams.

Thailand

Due to increased quotas allocated under the International Tin Agreement, Thailand production of tin in 1960 was about 23 percent higher than 1959. Practically all mines were operated on a full-time basis.

The new sea dredge of Tongkah Harbour Tin Dredging Ltd. was, by far, the biggest producer in 1960. About 1,267 long tons of cassiterite concentrate were recovered by this dredge which worked in the sea off Bhuket Island.

Although tin remained the only important mineral mined in 1960, a fluorspar mine commenced production in Ratburi in August, and a gypsum mine stepped up its production.

NEEDS NO RESHARPENING

Western Rock Bit design precludes the reverse taper dullness common to conventional bits and gives an effective drilling life, lasting far beyond the point where coventional bits must be withdrawn from service for resharpening.

Western Rock Bit's exclusive design accomplishes great drilling economies

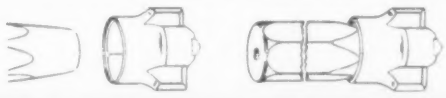
fast drilling-long life low first cost-low cost per foot of hole drilled

FORGED FOR TOUGHNESS FROM NICKEL ALLOY STEEL

An exclusive process extrudes the steel under pressure in a manner that preserves the important grain of the steel and imparts unusual strength to the bit body.

Strong Superior Connection

tapered socket — no threads



WESTERN ROCK BIT
Manufacturing Company
552 West 7th South - Salt Lake City 1, Utah

OCEANIA

Australia

Australian metal mining production in 1960 was not very different from that of 1959. Progress towards objectives designed to increase the output of several important metals—notably, aluminum, iron, and copper—was well maintained. The trend towards more smelting and refining within Australia continued. Major projects in the iron and steel industry were completed and more will be finalized during 1961. In 1961, also, important additions to domestic zinc, copper, and lead smelting and refining capacity are scheduled for completion. Still further expansion of smelting and refining is planned for iron, zinc, lead, and aluminum.

Government policy is increasingly directed towards overseas earnings by exports. Export of copper has increased notably in recent years although, in the world picture, Australia remains a small producer. The traditional ban on export of iron ore has been relaxed a little by permitting the sale of limited tonnages to foreign countries from designated deposits. Japan is expected to be the main buyer of iron ore as it is for copper concentrate. The first commercial shipments of bauxite from Australia occurred near the end of the year. Source was the Darling Ranges, Western Australia. Destination, Japan. This traffic is expected to increase considerably while shipments from Weipa, Queensland, are also planned for early in 1961.

"Big names" from distant fields appear with increasing frequency in mining press reports here, attracted by a favorable investment climate, political stability, and large areas virtually unexplored—names such as Utah Construction, Rio Tinto, Reynolds, New Consolidated Gold, and Union Carbide. There is no reason to doubt that investigations by these companies, coupled with continued programs by equally famous Australian names, will lead to expansion of known fields and the discovery of new mineral provinces.

QUEENSLAND: Superlatives describing progress by Mount Isa Mines Ltd. are almost becoming monotonous. A new 30 MW power station was commissioned and is already being doubled in capacity. Mining rate is being increased to 14,400 tons of ore per day. Concentrator expansion continues; the lead smelter will be modernized and a new copper smelter blows in during the second half of 1961. The subsidiary company, Copper Refineries Pty. Ltd., at Townsville, is refining 40,000 tons of blister annually and will be expanded to 100,000 tons capacity. A rolling mill is now in operation there.

A major rearrangement of interests in the Weipa bauxite holdings was announced in November. Consolidated Zinc Corporation terminated its agreement with the British Aluminium Co. Ltd. and is now associated with Kaiser Aluminum and Chemical Corporation in Commonwealth Aluminium Corporation (Comalco) instead. Comalco will proceed with development of the Weipa deposits at an estimated cost of £34,000,000. British Aluminium (Tube Investments—Reynolds Aluminum) will take over the Gove, Northern Territory bauxite deposits and the investigation of the power potential of Papua for aluminum smelting. Comalco has turned its interest towards New Zealand and Tasmania for smelting.

Testing of the Constance Range area by The Broken Hill Proprietary Co. Ltd. continued. Sufficient data are available to confirm that this is an important iron deposit. Activity by Mary Kathleen Uranium Ltd. and Mount Morgan Ltd. was in line with that for 1959. Consolidated Zinc Pty. Ltd. tested areas near the present Mount Morgan ore bodies on behalf of both companies.

NEW SOUTH WALES: The rutile and zircon beach-sand industry remained depressed throughout 1960 and sees no promise of improvement in 1961. The great lead-zinc mining companies of Broken Hill continued to be troubled by low lead prices and output restrictions; zinc is now helping to "carry" its heavier associate. The smaller zinc-lead mine at Captain's Flat (near Canberra) is reportedly in danger of closure. However, the Broken Hill companies are continuing forward development and are pressing on with several important projects in exploration as well as in smelting and refining. At Broken Hill, "South" and "North" companies, in association with The Electrolytic Zinc Co. (Tasmania) are investigating promising areas held by Broken Hill South Ltd. "South" and a subsidiary company of Consolidated Zinc rationalized their exploration for copper and other metals at Cobar where the Chesney and C.S.A. mines are being assessed by Cobar Mines Pty. Ltd. At Cockle Creek, near Newcastle, Consolidated Zinc's new zinc-lead smelter is nearing completion. The principal source of raw material will be New Broken Hill Consolidated Ltd.

Expansion in the iron and steel industry continued unabated at both the Port Kembla and Newcastle plants of The B. H. P. Co. Ltd. Years of expansion at these centers remain and plans are in hand by this giant among Australian companies for great developments in other states. Steel production capacity is now 4,000,000 tons per year.

VICTORIA: This State continues to be the Cinderella of Australia in metal-mining. Several small gold mines operated during the year. Limited production of and exploration for gold will continue in 1961.

TASMANIA: The Federal government sold its interest in the Bell Bay aluminum smelter to Comalco (Consol. Zinc-Kaiser) near the end of 1960. The Tasmanian Government retains an interest. The smelter will be expanded from its present capacity of 12,000 tons per year to 28,000 and, later, to 60,000 tons. Weipa will be the probable source of raw material.

The Electrolytic Zinc Co. of Australasia Ltd., Risdon, also has plans for expansion. Zinc refinery capacity will be increased from 115,000 tons to 140,000 tons annually.

The Mount Lyell Mining and Railway Co. Ltd., Queenstown, produced a little over 12,000 tons of copper from 2,000,000 tons of ore in its fiscal year, thus continuing its claim to mine the "world's lowest grade copper ore." The company, in association with Renison Associated Tin Mines N.L., has had reasonable success in proving reserves of tin ore at Renison Bell and will proceed to work the lodes.

1960 was brighter and 1961 may be even better for tin and tungsten producers in the island State. They were King Island Scheelite N.L., Aberfoyle Holdings Ltd., and North Australian Uranium Corporation. However, none of these mines are large by world standards, except perhaps King Island, and Australia will remain an importer of tin.

SOUTH AUSTRALIA: During 1960, as in previous years, the iron ore fields of the Middleback Ranges were the State's most important area of metal-mining activity. About 80 percent of Australia's iron ore comes from near Whyalla and is mostly shipped to Port Kembla and Newcastle, New South Wales. The B.H.P. Co. Ltd. plans to spend £40,000,000 at Whyalla for steel production and rolling. The official estimate of Australian iron ore reserves was recently quoted at 368,000,000 tons but pilot plant work on low grade jaspilites of the Middleback Ranges indicates that the economic reserves could be increased by 5,000,000,000 tons.

The new refinery of The Broken Hill Associated Smelters Pty. Ltd., Port Pirie, operated below capacity again in 1960. Output was approximately 190,000 tons and is not expected to vary greatly in 1961.

The State-owned uranium mine at Radium Hill is expected to close during the coming year.

WESTERN AUSTRALIA: Australia's largest State again produced over 80 per-

Metal Content of Australian Mineral Products from 1956 through 1960

Commodity	*1956*	*1957*	*1958*	*1959*	*1960*[1]
Gold[2]	1,029,821	1,083,941	1,103,980	1,085,119	1,093,000
Silver[2]	14,609,922	15,788,631	16,304,570	15,076,363	15,125,000
Copper[3]	54,547	59,255	75,715	94,699	110,000
Lead[3]	299,485	333,753	328,347	316,294	305,000
Zinc[3]	278,082	291,582	263,044	248,778	288,000
Manganese[3, 4]	25,856	34,904	25,623	40,672	35,000
Tungsten[3, 5]	1,582	1,409	850	653	1,100
Tin[3]	2,078	1,952	2,237	2,350	2,100
Rutile[3, 6]	93,242	124,863	80,955	79,624	83,000
Zircon[3, 7]	71,769	87,703	58,745	112,429	102,000
Sulphur[3, 8]	305,188	341,443	321,551	309,023	335,000
Iron ore[3]	3,923,985	3,805,473	3,925,524	4,150,293	4,340,000
Bauxite[3, 9]	4,618	3,758	3,533	3,639	17,000

1. Estimated. 2. Fine ounces. 3. Long tons. 4. Content of metallurgical grade ore. 5. WO_3 content. 6. TiO_2 content. 7. Zircon content. 8. Content of lead, pyrite, and zinc concentrates used in acid manufacture. 9. Al_2O_3 content.

cent of the country's gold. No major developments are expected in the coming year if economic conditions remain the same. Mines at Kalgoorlie appear to be maintaining good development but the Hill 50 mine, at Mount Magnet, has had little success in its drilling campaigns. Kalgoorlie Southern Gold Mines N.L., which has been searching for a repetition of the Golden Mile since 1950, will continue deep drilling in 1961.

Partial relaxation of the iron ore export ban by the Federal government will lead to some expansion of mining in future years. The State government has made an agreement with The B.H.P. Co. Ltd. whereby the latter undertakes to establish an iron and steel industry at Kwinana. In return, control of the important iron ore deposit at Koolyanobbing passes to The B.H.P. and the State-owned railway between Kwinana and Kalgoorlie will be converted to world standard gauge. To augment ore supplies for its eastern blast furnaces, B.H.P. will mine deposits at Koolan Island, Yampi Sound, in addition to those on Cockatoo Island.

Exploration for and development of other mineral deposits continued favorably in 1960 and should expand in following years. The name of Union Carbide Ore Company was coupled with vanadium ore discoveries along a 400-mile line between Meekatharra and Norseman. Western Aluminium N.L., a subsidiary of Western Mining Corporation Ltd., proved satisfactory deposits of bauxite in the Darling Ranges and appears likely to build an important export business to Japan. Japanese companies are also showing interest in Western Australian iron ore and manganese. Mitsui Mining and Smelting Company has actually taken a 20 percent interest in Ravensthorpe Copper Mines N.L., a small copper concentrate producer with development potential.

Mount Isa Mines Ltd. is showing interest in areas likely to contain potash and other salts.

NORTHERN TERRITORY: Following its withdrawal from the arrangement with Consolidated Zinc at Weipa, the British Aluminium Co. controls bauxite deposits at Gove. The Federal government's bauxite areas at Marchinbar were not sold to Comalco with its share in the Bell Bay smelter.

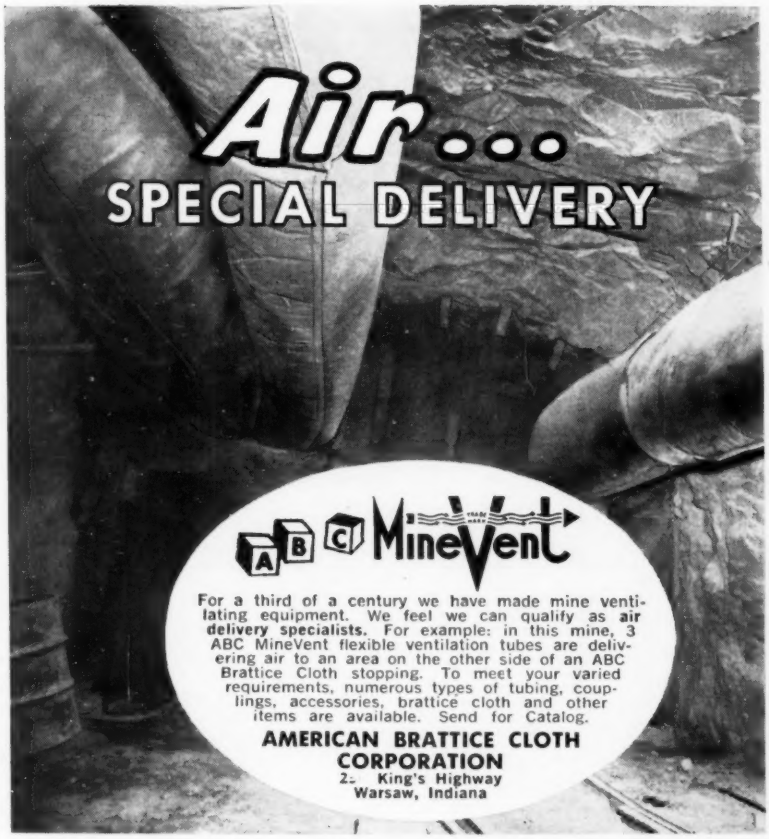
A high grade uranium ore body, with reserves at least equal to the total ore already mined there, has been discovered at Rum Jungle. The Federal government is to consider policy on the uranium industry in the near future; this industry is important in the sparsely-settled tropical north.

Peko Mines N.L. exported copper concentrate to Japan throughout the year and will continue to do so under long term contract. The ore body appears to be fading at about 1,100 feet. There were no favorable developments at Orlando.

Fiji

The industry remained very quiet and apart from the usual output of gold and silver there was only a small production of base metals.

Gold and silver output amounted to


Air...
SPECIAL DELIVERY
ABC MineVent
For a third of a century we have made mine ventilating equipment. We feel we can qualify as air delivery specialists. For example: in this mine, 3 ABC MineVent flexible ventilation tubes are delivering air to an area on the other side of an ABC Brattice Cloth stopping. To meet your varied requirements, numerous types of tubing, couplings, accessories, brattice cloth and other items are available. Send for Catalog.
AMERICAN BRATTICE CLOTH CORPORATION
2- King's Highway
Warsaw, Indiana

ACKER DOUBLE-DUTY RIG
FOR AUGER BORING OR CORE DRILLING!

Acker SP handles 5 foot hollow-stem or conventional auger flights. Switches to roller rock, carbide, saw tooth or diamond bit coring. The SP handles angle or vertical holes, deep or shallow in any formation.

Core drilling or augering problems anyone? Just name it—the Acker SP will tame it! It's rugged and versatile . . . switches from core boring to augering. It has muscle to auger 300 feet or core to 1500!

Acker's SP is designed for heavy duty service. It has a four speed cathead hoist, built-in reverse and four speed transmission. It's completely self-contained and mounts on truck. Owners of the SP are reporting unprecedented results drilling and augering for soil samples, in hollow stem augering and geophysical and geological exploration.

For more information write for Bulletin 31-ST or have us demonstrate the versatility of this advanced rig. There's no obligation!

ACKER DRILL CO., INC.
P. O. BOX 830 • SCRANTON 2, PA.

72,203 fine ounces and 31,319 fine ounces respectively, derived from the milling of 172,808 long tons of ore from the Vatukoula field, the only producer.

Base metal production was: manganese ore—1,908 long tons, iron ore—21,166 long tons, copper ore—47 long tons.

All the manganese ore came from the vicinity of Momi, in the south west of Viti Levu, and the iron ore, which consisted entirely of surface boulders, came from the same locality.

Surface exploration of the copper deposits of eastern Vanua Levu by Japanese interests continued and although no information has been released it is understood the prospects justify some underground testing which is about to commence.

The search for bauxite by Canadian interests in the outer islands of the group has not revealed any commercial deposits.

On the Vatukoula gold field the sole operator, Emperor Gold Mining Company Limited, built a new crushing and grinding section, incorporating a washing and sorting unit which has overcome the former difficulty of handling the very sticky ore from this deposit.

Underground development was satisfactory and revealed that the flat lying ore covered a much greater area than was originally believed.

Because of the very large lateral extent of the ore body and the high humidity, ventilation of the workings has been difficult and a new airshaft is being sunk from the surface to connect to the top of the Internal Shaft sunk from No. 8 level some years ago.

The main shaft has been sunk to No. 18 level and a large pumping station is to be installed at No. 16 Level which will allow the mining of the flat ore body to a depth of just over 2,000 feet.

The problem of the fixed price of gold, having regard to current costs, is the largest one facing this field in common with most of the gold producers of the world.

RESEARCH and EXPERIENCE
SPANG'S
Answer to Improved
DRILLING BITS
After 65 years in the field, Spang research engineers are still constantly working to improve the performance of cable system drilling tools.
This policy of continued research has provided Spang Drilling Bits with:
IMPROVED precision machining of the threaded joint.
LONGER, stronger pin collars.
TOUGHER, sturdier blade sections.
GREATER hardenability potential on the drilling end giving deeper penetration with fewer dressings.
Put Spang Research Experience to work for you—ask for SPANG DRILLING BITS in heat-treated Molloy (molybdenum silicon alloy steel) or heat-treated high carbon steel.
SPANG & COMPANY
BUTLER, PENNSYLVANIA
BRANCHES: Bolivar, N. Y., Mt. Pleasant, Mich., Winfield, Kan., Cisco, Texas

Indonesia

Although Indonesian production of tin-in-concentrates during 1960 reversed a declining trend of the last few years, the increase was very slight and output was still less than half the country's peak production of 54,000 tons in 1941. The total output for 1960 was 22,509 long tons, compared with 21,616 in 1959, 23,201 in 1958, and 27,723 in 1957.

Bangka contributed 13,674 tons in 1960, a slight decrease from 1959, while the mines at Billiton and Singkep had a total 1960 output of 8,835 tons, compared with 7,165 tons in 1959.

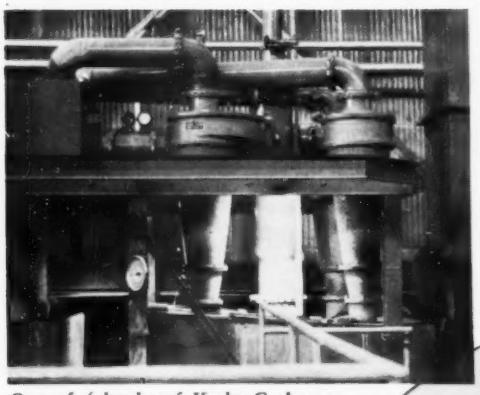
Early in the year a government-controlled mineral trading company contracted to supply three leading Japanese aluminum refineries with 800,000 tons of bauxite over a two-year period. The ore, which comes from the Bintan Islands, is to have a 53 percent alumina content.

The Indonesian minister for development and reconstruction announced start of construction on a three-unit iron and steel works, which will be partly financed by a Russian loan of $117,500,000. The project calls for a rolling and remelting unit in western Java with an annual capacity of 100,000 tons; a 50,000-ton-per-year furnace in the Sempung Lapung area of Sumatra, and a blast furnace in Kalimantan with a capacity of 250,000 tons annually. Domestic scrap iron and imported ingots will be used as raw material.

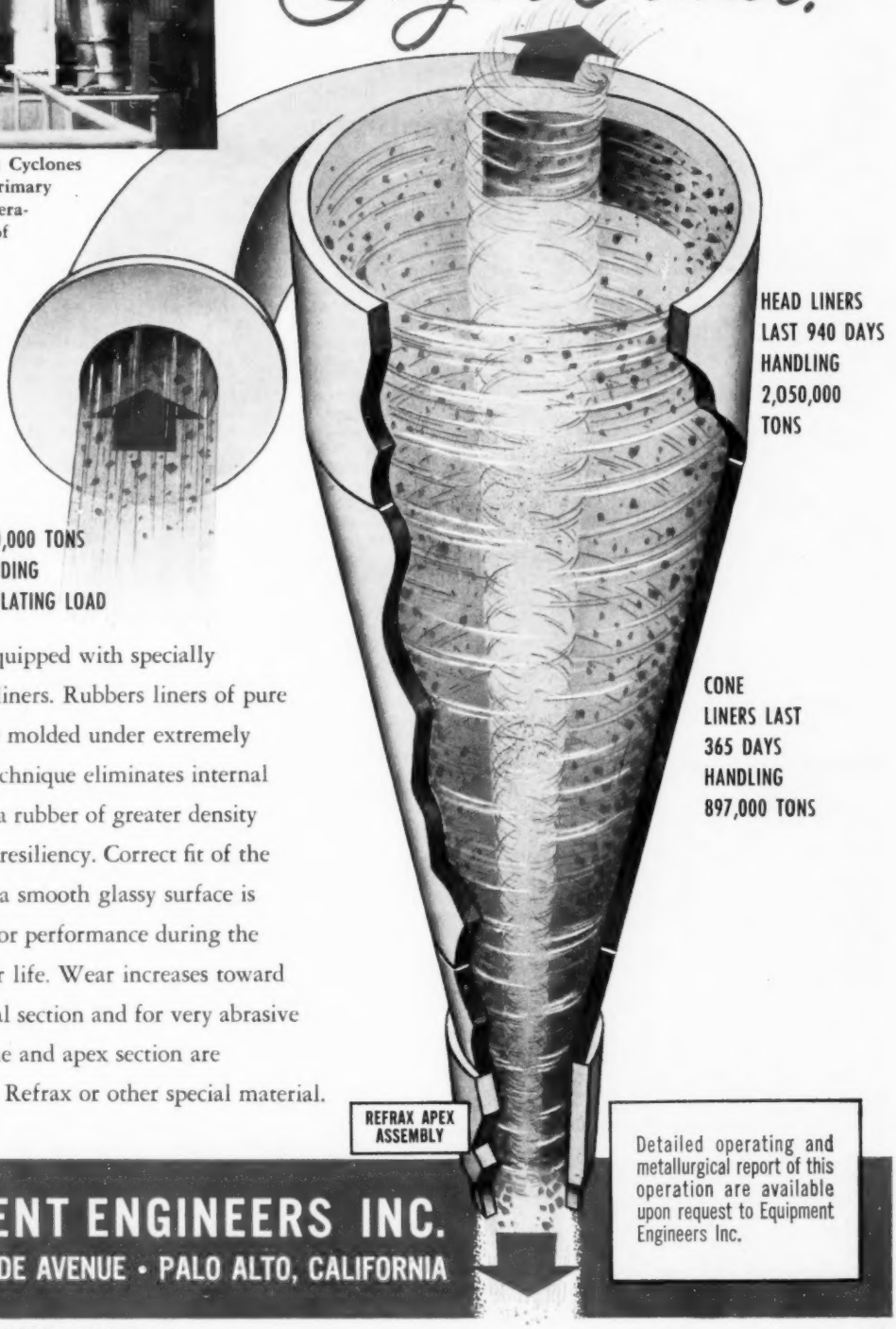
New Caledonia

Mining activity was again concentrated principally on nickel ores with an average of 3.1 percent nickel and 25 percent moisture. Almost half of the output was exported—exclusively to Japan—and the rest smelted locally into mattes and ferronickel. A fundamental characteristic of the industry of this island in 1960 was that other ores experienced mining activity only equal to that of 1959: iron ore, 276,000 tons of 55 percent Fe, all exported to Australia; chrome ore, 39,100 tons of 51 percent Cr_2O_3. Production of nickel ore increased from 1,381,000 tons in 1959 (compared with 595,000 tons in 1958) to 2,261,800 tons in 1960, exceeding the record high of 1957. It is hoped that in 1961 an even higher figure will be achieved, corresponding to the predicted increase of exports to Japan. The nickel content of metallurgical plant production exceeded 21,800 tons (11,800 tons in

Each KREBS CYCLONE handles 2,050,000 tons of primary ball mill discharge with *Original liner!*



One of 4 banks of Krebs Cyclones (4 in each bank) in primary closed-circuit grinding operation at Silver Bell unit of American Smelting and Refining Company.



Krebs Cyclones are equipped with specially designed replaceable liners. Rubbers liners of pure gum or Neoprene are molded under extremely high pressure. This technique eliminates internal porosity, resulting in a rubber of greater density without reducing the resiliency. Correct fit of the liners is assured, and a smooth glassy surface is maintained for superior performance during the greatly extended wear life. Wear increases toward the apex of the conical section and for very abrasive slurries the lower cone and apex section are frequently lined with Refrax or other special material.

Detailed operating and metallurgical report of this operation are available upon request to Equipment Engineers Inc.

EQUIPMENT ENGINEERS INC.
737 LOMA VERDE AVENUE • PALO ALTO, CALIFORNIA

1959) and should probably again increase in 1961. For chrome ore, the prospects are a little less encouraging, as production is related to outlets for export (France, Norway, Australia, and perhaps the United States in 1961). Prospecting activity directed towards nickel, chrome, copper, lead, and zinc was being maintained, but attempts at treatment of cobaltiferous ore had to be stopped.

New Guinea

In the Australian Territory of Papua and New Guinea, gold production from the Morobe field continued to be the only significant aspect of metalliferous mining. Bulolo Gold Dredging Ltd. and New Guinea Goldfields Ltd. were the principal operators.

1960 output is estimated at 45,000 ounces, 8 percent of which was due to small scale sluicing operations by native miners. 45,000 ounces of silver were also recovered.

Pacific Island Mines Ltd. carried out extensive trenching on a number of low grade lodes on Misima Island. This company reports that a pilot plant will be built to test the ore.

Diamond drilling of the Laloki copper deposits continued near Port Moresby. The area is under option to Consolidated Zinc Pty Ltd., but Nippon Mining Company of Japan has been interested as well in recent months.

In Netherlands New Guinea, 1961 is expected to see implementation of an exploration program for nickel and cobalt. A joint Dutch-United States company was recently formed in Holland, The Dutch parent, Oost Borneo Maatschappij, is to make a survey of the partly explored Carstensz Mountains in an endeavour to locate copper deposits there. (Mount Carstensz, 16,404 feet, is the highest point in the South West Pacific).

New Zealand

Apart from the Westland dredges of Arahura Gold Dredging Ltd. and Kanieri Gold Dredging Ltd., there was no significant metalliferous mining production in the Dominion during 1960. These companies produced a total of some 2,500 ounces of bullion per month but the final curtain is expected to fall on the Arahura property before the end of 1961. The Kanieri dredge has several years' life still.

New Zealand's greatest industrial development will be the smelting of alumina produced at Weipa, Australia, following an agreement between the Dominion Government and Commonwealth Aluminium Corporation (now Consolidated Zinc-Kaiser). A smelter having 120,000 tons aluminum ingot capacity per year will be built at Invercargill, in the south of the South Island. Power will first come from the Benmore, hydroelectric project and later, from the Lake Manapouri-Lake Te Anau scheme. Exploitation of the power potential of these lakes, which are about 80 miles from Invercargill, will begin in 1962. Total cost of the project, within New Zealand and Australia, is estimated at £Stg. 100,000,000.

The vast ironsand deposits of New Zealand continue to be only a potential asset. A government-owned company has been formed to investigate the potentialities of an iron and steel industry based upon ironsand as raw material. Despite the country's excellent power potential, the magnitude of the problem, the distance from markets and the efficient, low-cost Australian iron and steel industry, do not augur well for success in the near future.

Philippines

The Philippine mining industry enjoyed a good but not a record year in 1960. Record production of metallurgical chromite, almost all from the Zambales mine and mill of Acoje Mining Company, was the only new production mark set. While both the silver and zinc figures shown in the accompanying table also indicate record production they in fact represent record shipments only, in that nearly all the zinc and one-half the silver were produced from remilling of stockpiled concentrates by Surigao Consolidated Mining Company in Mindanao.

The drop in copper output was due in large part to lower shipments from the Bagacay mine of Marinduque Iron Mines Agents, Inc. in Samar where virtually all the high grade direct shipping ore had been mined out. The company's 400 ton per day flotation mill did not operate continuously during the year while metallurgical changes were made in the flowsheet. At year's end the mill was operating at capacity, treating ore from the open pit.

The Sipalay, Negros open-pit copper-molybdenum mine and 4,000 ton per day mill of Marinduque operated continuously during the year.

The Toledo open-pit mine and mill of Atlas Consolidated Mining and Development Corporation on Cebu, the largest tonnage operation in the Islands, operated at less than full capacity and recovered less copper because of mining problems. Stripping was behind schedule and emphasis during the year was placed on stripping with resultant sacrifice in mining rate.

Philex Mining Company operated its 1,900 ton per day flotation mill, open pit, and underground block cave Santo Tomas mines at capacity during the year. Development and caving of the third block was carried out without major trouble to prove that this type of mining is practical for disseminated copper deposits in the Islands. Philex is the newest large copper mine in the Philippines.

Lepanto Consolidated Mining Company operated its high grade underground copper-gold mine in the Mountain Province. Extensive development proved continuity of the main and branch vein systems in depth.

Refractory chromite production from Consolidated Mines, Inc.'s Masinloc, Zambales open pit mine and HMS mill was close to a record. The operation is managed by Benguet Consolidated Mining Company. Benguet is also the largest gold producer from the Antamok-Acupan-Balatoc mines in the Baguio district.

Itogon-Suyoc Mines Inc. continued operation on a reduced scale at its Itogon gold mine near Baguio and increased output from its Suyoc mine in the Mountain Province.

Benguet Exploration, Inc. operated its 50 ton per day mine and mill outside Baguio on high grade ore during the year. At year's end a zinc flotation circuit was being added to the mill.

Philippine Iron Mines, Inc. operated the nation's largest iron mine at Larap, Camarines Norte. As the open-pit mine gets deeper the stripping ratio has increased so that greater emphasis was placed on underground mining and beneficiation of lower grade ores during the year.

The outstanding discovery during the year was made by Acoje Mining Company at its Sierra Madre project in east-central Luzon where large reserves of high grade manganese ore were developed. Diamond drilling below the manganese indicated important reserves of good grade copper mineralization. Further exploration could well develop reserves to warrant the construction of a several thousand ton per day flotation mill and development of an open pit mine.

Marinduque Iron Mines Agents, Inc. continued engineering evaluation on its proposed copper-zinc refinery during the year, which led to a $13,000,000 loan from the Export Import Bank early in 1961 for construction of this refinery, which will convert copper concentrates into copper strip and sheet without smelting or electrolysis.

With the growing Japanese demands for metals the Philippine mining industry will expand as fast as the political and economic climate in the Islands encourages expansion to meet this important and growing market.

Production of Metals and Ores in the Philippine Islands for the Years 1953, 1954, 1955, 1956, 1957, 1958, 1959, and 1960[1]

Commodity	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*
Gold[2]	480,625	416,052	419,112	406,163	379,982	422,833	402,615	410,618
Silver[2]	572,046	502,069	N.A.	541,169	479,216	497,987	504,085	1,133,343
Chromite[3]								
Metallurgical	88,541	62,595	59,745	127,370	113,358	34,489	118,952	128,426
Refractory	468,549	388,590	535,262	581,685	612,158	381,821	534,535	606,013
Iron ore[3]	1,217,864	1,424,898	1,432,712	1,440,232	1,346,363	1,098,732	1,230,193	1,138,770
Copper[3]	12,715	14,349	17,461	26,963	40,382	47,030	49,521	44,010
Manganese ore[3]	21,508	9,393	11,912	4,414	30,231	22,308	34,804	17,381
Lead[3]	2,434	1,827	2,318	2,140	814	1,284	355	122
Zinc[3]	747	—	—	950	302	—	5	4,978
Mercury[4]	—	—	635	3,015	3,363	3,321	3,500	3,041
Molybdenum[3]	—	—	—	—	—	—	44	28

1. From Philippine Bureau of Mines. 2. Fine ounces. 3. Metric tons. 4. Flasks (76 pounds).

CARIBBEAN

Jamaica

In 1960 Jamaica continued to maintain its leadership as the free world's major bauxite producer and exporter. There was only a slight decrease in ore export over 1959, but on the other hand alumina exports showed an increase of over 60 percent.

According to figures compiled by the Jamaican Mines Department the exports of kiln-dried bauxite amounted to 4,856,924 tons (4,147,550 tons of moisture-free ore) as against 4,883,902 tons in 1959.

As in previous years, the ore was exported to the United States by the two major producers—Reynolds Jamaica Mines Ltd. and Kaiser Bauxite Company. In addition to these exports 1,597,236 tons of bauxite (dry basis) were mined by Alumina Jamaica Ltd. for processing into alumina in the company's local alumina plants. It is estimated that 665,361 long tons of alumina were produced and shipped during 1960 as compared with 399,210 tons in 1959. Shipment was made to Canada (399,958 tons), Norway and Sweden (255,267), India (9,440 tons), British Guiana (582 tons), and Trinidad (114 tons). The tonnage to Trinidad is used in glass making.

Alumina production in 1960 was estimated to be 8 percent below the rated capacity of the company's two alumina plants at Kirkvine and Ewarton. The bauxite mined and used in production of alumina in a large measure offset the decreased ore exports by the other two companies and helped Jamaica to end up with another bauxite production record of 5,744,790 tons (dry basis) for 1960. This topped the previous record figure in 1958 by about 23,000 tons.

Kaiser Bauxite Company in December, 1960 completed its West Essex Valley railroad to join its Friendship property to the main Kaiser railroad at Comfort. The addition of this four-mile railroad brings the length to 21 miles. Mining of the Friendship property commenced in December 1960.

Kaiser's plans for future expansion to embrace the north coast parishes of St. Ann and Trelawny with port, plant and mining facilities progressed at a steady rate during 1960. The company continued purchasing land, making surveys, resettling farmers, and constructing access roads; completed plans for a railroad, did preliminary drilling, and spotted sites. At the end of the year the work had reached a fairly conclusive stage on paper. In building the railroad it was proposed to build a bridge over the Rio Bueno River, which would be one of the highest railroad bridges in the world, and certainly the largest bridge of any type in the Caribbean area. Once all initial studies have been successfully completed and a decision reached to go ahead, construction of the bridge was expected to take approximately one year.

During 1960, the company mined and shipped 2,599,176 dry long tons of bauxite to the United States. This represented a 10 percent increase in production over 1959.

During the year Reynolds Jamaica Mines maintained a steady rate of production although this was 15 percent less than in 1959.

Alcoa Minerals of Jamaica, a wholly owned subsidiary of the Aluminum Company of America, completed its prospecting and evaluation program in the Mocho area of Clarendon in May 1960 and exercised its option on a lease over 50 square miles formerly held by Caribex Ltd. In December 1960 the company announced the award of a dredging contract as an initial step in development of the bauxite properties approximately 15 miles from Jamaica's south coast.

This dredging project, a preliminary to the development of facilities for mining and shipping of bauxite from Jamaica to Point Comfort, Texas by mid-1963, was started in December 1960 and is expected to be completed by June 1, 1962.

Harvey Aluminum Company of the United States commenced active prospecting on a special exclusive prospecting license in the parish of Saint Catherine, which covers an area of approximately 49 square miles. The company erected offices and a laboratory, and started drilling tests in the area.

There was a further decrease in the production of gypsum by Jamaica Gypsum Ltd. during 1960. The company announced, however, that boom production during the previous two years was abnormal and the 1960 production represented more accurately what future annual production would be.

Prospecting for other minerals during 1960 was carried out by 10 companies, the Jamaica Industrial Development Corporation, and three individuals. Seven licenses are pending from three companies and two individuals.

There were 24 current Exclusive and Special Exclusive Prospecting Licenses for copper, 19 of them being held by Jamaica Copper and Iron Ltd. In November and early December 1960 Camp Bird Mining Ltd. made applications for three Exclusive Prospecting Licenses.

During the year Jamaica Copper and Iron Ltd. carried out further geological mapping and compilation of geophysical information over some areas. It was expected that prospecting activities would be stepped up during 1961.

Production of Minerals in Jamaica in Long Tons by Years from 1952 through 1960

Year	*Kiln Dried Bauxite*	*Alumina*	*Gypsum*	*Kiln Dried Phosphate*	*Cement*
1952	340,419	—	N.A.	N.A.	13,483
1953	1,154,172	28,732	N.A.	707	99,300
1954	2,043,786	106,366	159,877	714	96,301
1955	2,645,345	183,968	83,155	477	106,974
1956	2,141,688	207,333	124,876	384	130,143
1957	4,596,028	435,752	189,161	100	139,163
1958	5,721,990	373,108	599,591	137	175,397
1959	5,125,603	399,210	385,567	40	193,600
1960	5,744,790	665,361	221,560	100	209,069

N.A. Not available.

JOHN BEAN HANDLES
THE TOUGH MINING JOBS

John Bean High Pressure Reciprocating Pumps provide capacities from 0.5 gpm to 100 gpm and pressures from 100 to 12,000 psi.

1. Core Drilling
2. Mine Dewatering
3. Water Service
4. Fire Control
5. Process Pumping

ALSO: packaged power pumping units, custom designed pumps, and high pressure washing units.

WRITE FOR FREE CATALOG

John BEAN fmc
DIVISION OF
FOOD MACHINERY AND CHEMICAL CORP.
San Jose, Calif. • Lansing, Mich. • Orlando, Fla.

INDUSTRIAL PUMPS
Dept. MW-5
San Jose 1, California • Lansing 4, Michigan

NORTH AMERICA

Canada

by T. H. Janes,
Mineral Resources Division,
Department of Mines and
Technical Surveys,
Ottawa, Canada.

The Canadian mineral industry in 1960 was characterized mainly by steady and widespread growth in developing known deposits for production rather than by major exploration efforts and significant mineral discoveries.

Canadian nickel production reached an all-time high of 213,641 tons in 1960, a gain of 14.5 percent over the previous year. The industry operated at maximum production capacity and continued its program of exploration and development and the expansion of treatment facilities. The Thompson project of the International Nickel Company of Canada Ltd. in northern Manitoba began production during the year. Its first electrolytic nickel output is expected in February, 1961 upon completion of the refinery. Other phases of the 75,000,000 pounds-a-year nickel-producing operation were completed and artificial nickel sulphide anodes stored for refining. The expansion of Canadian nickel production, smelting, and refining facilities by International Nickel and other producers to nearly 500,000,000 pounds annually assures an ample and continuing supply of this commodity that is of such vital importance to modern industry and technology.

Copper output recorded a new high of 438,383 tons in 1960, an increase of 43,114 tons over the record set the previous year. Ontario is the leading copper-producing province with about 45 percent of the total output, followed by Quebec with about 35 percent and by Saskatchewan, Newfoundland, Manitoba, and British Columbia in that order. Twenty-four companies operating 43 mines contributed to Canada's copper distribution in 1960.

Uranium production in Canada at 12,517 tons was down over 19 percent from the 1959 production of 15,497 tons, the output being in the form of uranium oxide (U_3O_8). The structure of the uranium industry changed during 1960 as a result of the announcement on November 6, 1959 by the Canadian government that producers could stretch out the remainder of their undelivered uranium under firm contract until November 30, 1966. Permission was also granted for the transfer of contracts between companies. The changed conditions of the industry were brought about by the decision of the United States Atomic Energy Commission not to exercise its options to purchase additional quantities of Canadian uranium after the expiration of existing purchase contracts. Most of those contracts were to end on March 31, 1962 with some continuing to March 31, 1963. Following company amalgamations and transfers of contracts between companies, there were only 10 mines in operation at the end of 1960 compared with 19 one year previously. An outstanding feature of the mines that remain in production has been the lowering of production costs. Most mines are now able to produce uranium concentrates at an operating cost under $3.75 a pound of U_3O_8 content. Canadian reserves of measured, indicated and inferred ore at the beginning of 1960 were estimated at 308,500,000 tons averaging 0.12 percent U_3O_8, equivalent to 370,200 tons of U_3O_8. Of these reserves, 96 percent are in the Elliot Lake area of Ontario.

Canadian iron ore shipments from 12 companies, operating 18 to 20 mines, decreased 12 percent from the all-time high of 21,864,576 long tons in 1959 to 19,203,378 tons in 1960. Canada's principal iron ore markets are the United States, United Kingdom, Western Europe and Japan in that order. Shipments to the United States declined from 11,619,633 long tons in the first 10 months of 1959 to 10,130,264 tons in the same period of 1960. Exports to all other markets were higher in 1960 than in the previous year.

Mine production of zinc in 1960 increased to 405,620 tons from 396,008 tons in 1959. Production of lead at 189,267 tons was only 2,572 tons above that of the previous year.

Gold production in 1960 at 4,602,762 ounces was 119,346 ounces higher than in 1959. The price paid for gold by the Royal Canadian Mint averaged $33.32 a fine troy ounce in the first quarter of 1960, was over $34.00 an ounce by midyear, and reached a high of $34.82 for the last week of the year. The government of Canada extended The Emergency Gold Mining Assistance Act for an additional three years to the end of 1963.

In the industrial minerals field asbestos shipments increased to 1,140,538 tons valued at $118,700,998, about 10 percent above the previous year's record output. Through an exchange of technical missions in 1960 it was learned that Russia's asbestos production capacity now is about equal to Canada's. About 90 percent of the Canadian production comes from 13 mines in the eastern Townships of Quebec, the remainder from two mines, one at Matheson, Ontario and the other at Cassiar, British Columbia. Canada is becoming a major producer of sulphur through the production of natural gas in western Canada and now ranks fourth in the Free World production of sulphur in all forms with total output in 1960 of about 1,000,000 tons.

Mineral Production of Canada, 1958, 1959, and 1960 from Dominion Bureau of Statistics

Metallics	*1958*	*1959*	*1960*[1]
Antimony[2]	858,633	1,657,797	1,522,700
Bismuth[2]	412,792	334,736	464,440
Cadmium[2]	1,756,050	2,160,363	2,244,783
Calcium[2]	25,227	67,429	76,560
Cobalt[2]	2,710,429	3,150,027	3,330,914
Copper[2]	690,227,408	790,538,660	876,766,931
Gold[3]	4,571,347	4,483,416	4,602,762
Iron ore[4]	15,726,323	24,488,325	21,507,783
Lead[2]	373,360,966	373,391,461	378,533,595
Magnesium[2]	13,591,705	12,204,448	14,746,427
Molybdenum[2]	888,264	748,566	758,507
Nickel[2]	279,117,422	373,110,226	427,282,898
Palladium, iridium, etc.[3]	154,366	177,713	238,489
Platinum[3]	146,092	150,382	221,832
Selenium[2]	306,990	368,107	562,272
Silver[3]	31,163,470	31,923,969	32,328,143
Tellurium[2]	38,250	13,023	56,352
Thorium[2]	—	47,447	129,894
Tin[2]	795,496	747,443	515,300
Titanium ore[4]	—	26,777	1,700
Tungsten (WO_3)[2]	690,976	—	—
Uranium (U_3O_8)[2]	26,805,232	31,784,189	25,034,889
Zinc[2]	850,197,572	792,015,223	811,239,533
Asbestos[4]	N.A.	1,050,429	1,140,538
Barite[4]	N.A.	238,967	155,506
Lithia[2]	N.A.	2,756,280	205,000
Pyrite[4]	N.A.	1,099,564	1,004,366

1. Preliminary. 2. Pounds. 3. Troy Ounces. 4. Tons. N.A. Not Available.

Cryolite, Lead, and Zinc Exports from Greenland, and Cryolite Concentrate Exports from Denmark in Metric Tons from 1955 through 1960

Year	*Cryolite To Denmark*	*Cryolite To United States*	*Total*	*Cryolite Concentrate Exported From Denmark*	*Lead*	*Zinc*
1955	33,512	8,299	41,791	18,230	6.0	0
1956	30,090	10,500	40,590	19,232	3,663	4,837
1957	33,893	14,500	48,393	21,985	8,461	12,896
1958	30,270	12,000	42,270	20,986	9,586	8,644
1959	29,440	12,600	42,040	21,662	10,825	9,517
1960[1]	32,800	9,200	42,000	23,570	10,000[2]	9,000[2]

1. Estimated. 2. All production stockpiled.

Greenland

Mining of cryolite at Ivigtut in southern Greenland continues to be the most important mineral industry. A new concrete dam to separate the open-pit mine from the sea was completed. Preparations are being made to reclaim the material deposited in the harbor area during the first years of mining.

A new flotation plant will be started in 1961 in Copenhagen, Denmark by Kryolitselskabet Oeresund A/S to improve the quality of cryolite concentrate, especially reducing the silica content to traces.

The lead and zinc at Mesters Vig, East Greenland will be depleted in a year or two.

The drilling program on the molybdenum deposit near Mesters Vig continued, and some technical problems concerning transport and water supply have been solved. The grade ranges from 0.25 to 0.40 percent MoS_2. Ore reserves are believed to be between 15,000,000–20,000,000 tons.

more money for your money belt..

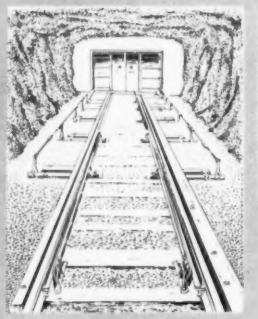
with

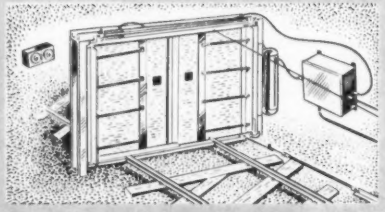
"CANTON"

MINING EQUIPMENT

Remember you can install a "Canton" now and pay us out of savings.

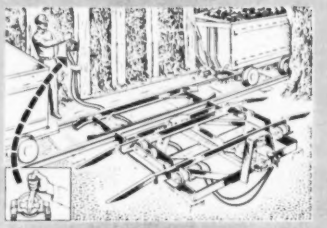
Write for complete brochures. Please use street and zone numbers.





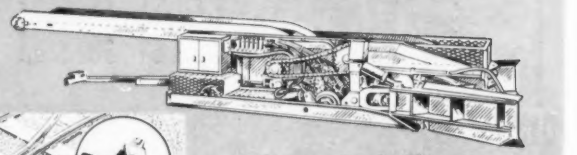
Canton Automatic Mine Doors

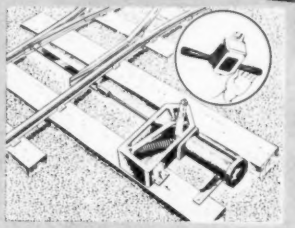
The Automatic Door operates mechanically by weight of car on activating levers. Air power operation may be had where desirable. Operates at any trip speed. Two doors provide air lock.



Air Power Car Transfer

One man does the work of three and faster. Entire train loaded out on a single track. Expedites servicing cars to mucking machine.



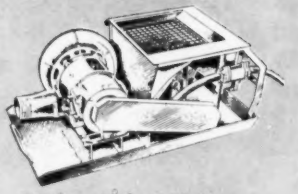


Track Switch Thrower

Either electric or air operated. Route selections made by motorman at full trip speeds. Eliminates accident potential and extra man. Also ideal as Derailer. Manual or automatic contactors available.

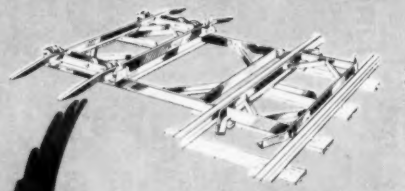
Canton Track Cleaner

Clean entire track area mechanically in one pass—no costly hand labor, no dozers or loaders required—hydraulic controls throughout. "Pays for itself in one sweep through mine." Now used in coal, iron, copper, lead, potash, and salt mines.



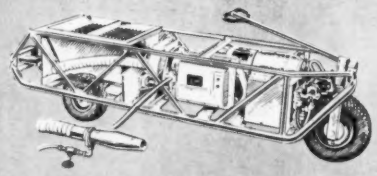
Mighty Midget Duster

Weighs only 280 lbs. Easily moved on shuttle car. Hand cart available. Ideal for small mines—inexpensive—capacity 7 tons dust per shift.



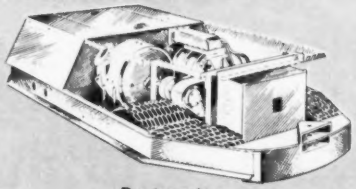
Manually Operated Car Transfer

No alterations to track—quickly installed and relocated—less rib to shoot than for jump switch—no hazards of cherry picker, anti-friction bearings for easy hand operation.



Little Chief for Wet Or Dry Dusting

Rubber tire model 22½" high—skid model 18½" for shuttle buggies, belts or mine cars; hydraulic self-propelled model available. 34 to 60 lbs. dust per minute through 50 to 250 ft. of 2" hose.



Dustmaster

The track mounted Hi-pressure "Dustmaster" is the most powerful Duster ever built. Distributes dust to back areas 500 feet from haulway.

Canton Cable Splicers

Reduce down-time in splicing cable. Machine man should carry a pocketful. Just pound around cable and keep on working. No special tools required.

The American Mine Door Company

2071 DUEBER AVENUE, S.W. • CANTON 6, OHIO

EUROPE

Austria

In general 1960 proved to be a good year for Austria's mining industry. Ores and minerals increased output figures as compared with 1959.

Iron ore production surpassed the 1957 figure which had been the highest ever reached before. Thus, production of steel for the first time surpassed the 3,000,000-ton mark.

Magnesite also hit its top record. Output increased at a rate of 35 percent as compared with the previous year. This was due mainly to the new mining enterprise at Hochfilzen, Province of Tyrol (Österr. Amerikanische Magnesit A. G., Radenthein) which developed the second largest magnesite mine of Austria. The magnesite industry plans to install modern flotation plants. Such developments will definitely contribute to a further expansion of this industry.

Last year this review reported the amazing 200 percent increase of graphite output. This 1959 figure again was raised 42 percent. Pryssok & Co. K. G., for two years mining lower Austria's graphite deposits at Zettlitz, commenced open-pit mining operation at Trandorf near Spitz, Province of Lower Austria, delivering 5,000 tons of graphite ore monthly to the blast furnaces of Österr. Alpine-Montangesellschaft, Donawitz. Pryssok and Co. K. G. also were busy establishing a beneficiation plant for graphite. It is planned to produce finely ground graphite powder for black washes and, later on, floated products of high carbon content.

Extraction of gypsum and anhydrite as well as of talcum and kaolin improved tremendously as compared with the previous year. The first two products are used by Austria's expanding chemical industry, while talcum and kaolin found a new good market in the Soviet bloc.

General outlook for 1961: The upward trend seems to prevail although such record increases as reported today cannot be expected.

Austrian Production of Ores, Minerals, and Metals in Metric Tons for 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Iron ore	3,410,381	3,382,348	3,541,564
Lead-zinc ore	187,912	193,957	192,833
Copper ore	164,489	162,600	139,639
Antimony ore	11,198	12,978	14,823
Molybdenum ore (Scheelite)	5,820	5,990	6,252
Bauxite	23,570	23,981	26,006
Gypsum anhydrite	541,988	653,566	662,575
Graphite	21,154	62,091	88,036
Magnesite	1,221,193	1,201,210	1,625,406
Talcum	70,828	50,777	82,394
Kaolin	300,265	297,583	323,094
Lead, conc.	7,486	7,426	7,155
Copper	9,392	9,713	7,625
Zinc, conc.	—	—	13,063
Antimony, conc.	—	—	927
Aluminum	74,266	75,348	90,025

Eire

With its 4,000 ton per day mine and mill running nearer to full capacity, the Avoca, County Wicklow, mine of St. Patrick's Copper Mines Ltd. (subsidiary of Canadian Consolidated Mogul Mines Ltd. and Irish Copper Mines Ltd.) increased copper output to the position of the country's most valuable mineral product in 1960. Shipments of byproduct pyrite, potentially over 100,000 tons yearly, were still limited by demand, though less severely than in 1959.

Prospecting for copper, generally in the vicinity of 100-year-old mining districts, continued with the main activity by the Irish subsidiaries of Canadian companies. Canadian companies involved include Consolidated Mogul Mines, Northgate Exploration Ltd. (also investigating lead and molybdenite deposits), Denison Mines Ltd., and Can-Erin Mines Ltd. The latter stated in September that at its Allihies, County Cork, prospect 32 holes indicated 1,600,000 tons grading 1.83 percent and 750,000 tons grading 1.73 percent copper in the north-south and east-west lodes respectively.

Lead-zinc output continued to come from replacement ore bodies in Mississippian limestone at the County Sligo property of New Abbeytown Mining Co. Production of these minerals at the Tipperary mine of Silvermines Lead & Zinc Co. Ltd. remained in suspense, but an agreement was made by the company to sublease the associated barite deposits to Magnet Cove Barium Corporation of Texas, which is to ship at a rate between 50,000 and 100,000 tons yearly. This is likely to be the largest new production of 1961.

Mineral Production in Eire in Long Tons in 1959 and 1960

Commodity	*1959*	*1960*[1]
Copper[2]	4,715	5,969
Lead[2]	1,526	1,386
Zinc[2]	1,272	1,276
Pyrite conc.	3,405	19,814
Gypsum	126,029	146,353
Barite	8,365	8,830
Silica	2,717	1,890
Calcite	2,047	2,481
Semi-bituminous coal	82,697	71,388
Anthracite	146,499	156,737

1. Estimated. 2. Metal content of concentrate.

Finland

Production figures in the Finnish metal mining industry show a small overall increase during 1960 when compared with the two preceding years.

The new Kotalahti copper-nickel mine of Outokumpu Company reached full production in 1960. The nickel concentrate obtained is treated in a new nickel plant built for this purpose. Also, development work at Korsnäs lead mine was completed in 1960 and the mine and concentrator were ready for operation at the end of the year.

The Pyhäsalmi development of Outokumpu Company including the mine and concentrator at Pyhäsalmi and the pyrite treatment plant at Kokkola was in full progress and will be completed in 1961 or 1962. When in operation, this mine will increase the Finnish copper production by 15 percent and zinc production by 30 percent. Furthermore, the pyrite cinder will provide a welcome addition to the Finnish iron ore production.

Outokumpu Company is also investigating a newly discovered chromite deposit in the immediate vicinity of Kemi City in northern Finland.

The development of Jussarö iron mine and concentrator by Vuoksenniska Company advanced in 1960 to such an extent that production will be started during the first part of 1961.

In 1961 and 1962, substantial enlargements will take place in the volume of the Finnish metal mining industry.

Ores Milled, Minerals, and Metals Recovered by Finnish Mining Companies in Metric Tons for 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
OUTOKUMPU COMPANY			
Ore milled	1,431,555	1,455,899	1,784,304
Copper conc.[1, 2]	138,725	144,645	135,833
Pyrite conc.	250,072	258,011	253,937
Zinc conc.	85,630	98,383	77,044
Lead conc.	3,970	3,363	3,124
Nickel conc.	—	—	36,064
Tungsten conc.	318	67	—
OTANMAKI COMPANY			
Ore milled	639,379	573,535	597,267
Iron conc.	214,970	171,969	151,176[3] 6,952[3]
Ilmenite conc.	106,489	86,152	83,660
Pyrite conc.	4,473	4,769	5,750
V_2O_5 (100%)	697	903	1,013
At Karvasvaara:			
Ore milled		56,900	127,759
Magnetite conc.		34,054	87,193
VUOKSENNISKA COMPANY			
Ore milled	107,000	118,000	117,700
Gold[4]	202	230	184
Copper conc.	1,440	3,080	1,910

1. Average Cu content for 1959 was 20.0 percent. 2. Average Cu content for 1960 was 20.7 percent. 3. The first figure for 1960 indicates vanadium-leached hematitic pellets, the second figure unleached magnetite concentrate. 4. Kilograms.

Federal Republic of Germany

In 1960, mine production of all ores and minerals—with the exception of lead, silver, and bauxite—was higher than in 1959.

Also the production of all metals except unalloyed tin, bismuth, and cadmium increased.

Mine Production in Metric Tons in Western Germany in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*[1]
Lead ore[2]	61,900	53,000	49,900
Zinc ore[2, 3]	117,300	105,700	114,500
Copper ore[2]	1,700	2,000	2,200
Silver in ore[2]	66	59	56
Pyrite	570,000	470,000	536,000
Iron ore, crude weight	17,984,000	18,063,000	18,869,000
Iron ore, iron content	4,745,000	4,788,000	4,998,000
Potash salts, crude weight	16,664,000	17,422,000	18,642,000
Potash salts, K_2O-content	2,017,000	2,144,000	2,316,000
Salt (rock and evaporated)	3,573,000	3,648,000	3,969,000
Bauxite	3,839	4,504	3,812
Graphite	10,900	11,200	12,000
Fluorspar	117,903	114,559	121,000
Barite	371,134	388,551	481,000

1. Preliminary figures. 2. Recoverable metal content. 3. Including recoverable zinc content of pyrite.

Smelter Production in Metric Tons in Western Germany in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*[1]
Aluminum	136,766	151,165	168,937
Lead (incl. lead produced by battery manufacturers)	173,404	192,419	206,793
Copper, refined	268,249	281,889	309,074
Zinc, excluding dust	179,258	187,943	191,918
Tin, unalloyed	1,827	2,108	1,898
Tin alloys	2,770	3,105	3,731
Solder	11,791	12,959	14,383
Cadmium	319	420	409
Cobalt	994	1,402	1,540
Nickel	1,133	1,001	2,523
Bismuth	157	140	120
Silver	304	375	425
Gold	2.5	2.2	3.0
Pig iron	16,659,000	21,602,000[2]	25,739,000[2]
Steel ingots and castings	22,785,000	29,435,000[2]	34,100,000[2]

1. Preliminary figures. 2. Including Saar.

France

France, which ranks third in the world in production of iron ore, produced 66,911,000 tons in 1960, almost 10 percent more than in 1959. Increased output due to technical progress will continue, and the forecast is for production exceeding 80,000,000 tons in 1965. This is the objective of the French Fourth Plan for modernization. Production of pig iron reached 14,150,000 tons (12,500,000 tons in 1959), and that of steel exceeded 17,000,000 tons (compared with 15,000,00 in 1959). It is noteworthy that expansion in steel production was 13 percent, compared with only four percent between 1958 and 1959.

The Alsatian potash mines again increased their production (net extraction, as K_2O: 1,732,000 tons in 1960, compared with 1,659,000 in 1959). The mines are now in the midst of an expansion plan which will allow annual production of commercial salts to rise to 1,700,000 tons of K_2O annually, despite the lower grade of ore mined.

Bauxite surpassed its 1958 record by a wide margin (2,038,000 tons compared with 1,798,000 tons) and the production of calcined alumina rose to 595,000 tons, or close to six times the 1938 figure. Production of aluminum again increased, reaching 235,000 tons, due mainly to the placing into operation of new installations in the Basses-Pyrénées.

Magnesium followed a similar course, but for a tonnage one hundred times less; production is still insufficient and dependence on imports is still necessary.

French production of copper ore is insignificant; there is no treating plant, but production of electrolytic copper amounted to 28,500 tons, the same as in the preceding year.

France produces no manganese ore; therefore, as in past years, metallurgical plants had to call upon imports for this alloying metal.

Production of nickel, through treatment of mattes from New Caledonia, is being increased (10,000 tons compared with 6,900 tons).

Production of 63 percent lead concentrates rose to 27,760 tons. That of 55 percent zinc concentrates rose to 31,460 tons. This represents an increase of about 10 percent over the preceding year. Predictions remain the same for 1961 as for 1960. Conversely, production of tungsten suffered a cutback and only one French tungsten mine remained active. Pyrite output also declined slightly.

Metallurgical plants, treating largely imported ores, recovered 74,400 tons of lead and 150,000 tons of zinc, an increase of several thousand tons in comparison with 1959. Production of silver increased notably, due to treatment of high argentiferous lead ores from abroad.

With regard to ferroalloys, France benefited from a particularly favorable hydroelectric power year, which permitted it to compete in exports with certain countries less favored this year, such as Norway. Recently installed equipment facilitated production of these additional tonnages. Production of refined and super-refined ferrochrome is constantly on the increase, as exports require increasing quantities of stainless steel. Production of ferrosilicon increased almost 20 percent.

Satisfactory progress in refining of pure metals, especially titanium and zirconium for nuclear and electronics use, should also be emphasized.

Numerous exclusive permits for exploration of metalliferous deposits were granted, aside from exploration for uranium ore, which was being carried on successfully.

Prospects for 1961 are still quite favorable.

We are authorized to report some information on French production of uranium: Production of ore amounted to about 500,000 tons for the first three quarters of 1960. Total production for the year 1960 can thus be estimated at between 650,000 and 700,000 tons (in comparison with 593,000 tons in 1959), and the uranium content of the chemical concentrates at about 800 tons (730 tons in 1959). Production of uranium metal, which was 410 tons in 1958 and 480 tons in 1959, actually exceeded 500 tons in 1960.

Mineral and Metallurgical Production in Metric Tons in France for 1959 and 1960

Commodity	*1959*	*1960*
Iron ore	60,918,000	66,911,000
Pig iron	12,472,000	14,144,000
Raw steel	15,075,000	17,279,000
Bauxite	1,757,000	2,038,000
Calcined alumina	567,000	595,000
Aluminum metal	173,000	235,000
Antimony regulus	1,875	1,435
Silver[1]	58,792	94,054
Bismuth	13.6	3.2
Copper metal	28,700	28,500
Cobalt metal	307	530
Magnesium	1,758	2,140
Refined nickel metal	6,900	10,000
Gold[2, 4]	9.0	
Lead metal	69,800	74,400
Zinc metal	147,200	150,100
Tungsten ore	816	690,000
Ferrosilicon (50% Si)	86,600	104,000
Asbestos[3]	21,000	25,000
Potassium[4]	1,659,000	1,732,000
Pyrite[5]	294,400	
Sulphur[6]	426,000	791,000

1. Kilograms. 2. Cathodes. 3. Merchant asbestos. 4. AsH_2O. 5. Does not include arsenopyrite with gold and silver. 6. From natural gas.

Greece

Mining of bauxite, chromite, magnesite, and iron ore increased in Greece during 1960. Important exploration work and plans for local refining of ores indicate that there will be a modest expansion in mine output in the years ahead.

Most important developments were the contract between the Greek government and the French metallurgical company Pechiney for the establishment of an aluminum plant.

The Greek Institute for Geology and Subsurface Research carried out several drilling campaigns during the year. Drilling for chromite in the Burinos Kozani district of northwest Greece is reported to have been satisfactory. Elinika Letalia, Inc. was the co-sponsor. It is hoped to develop reserves to warrant building a concentration plant. Exploration for iron ore started on the western end of the island of Crete where one iron mine was in production and a number of iron oxide outcrops are known. Geological surveying of the bauxite deposits of the Parnassus Mountains continued.

The Subsurface Institute and the Greek Committee of Atomic Energy undertook geophysical exploration for radioactive minerals. It is understood that best results were obtained in Kirki, West Thrace; Statonion in central Macedonia; and Larissa in central Greece.

Reopening of the Mandoudi magnesite mine in north Euboea was started after a closure of six years. Mining of a magnetite ore body discovered in 1957 started at the Seriphos iron mine. Production of 50,000 tons of ore was well below 1957 output.

Mining of a recently discovered bentonite deposit on Chios Island started. I. Sendonas Company of Athens built a 20,000-annual-ton-processing plant. Reserves have been estimated at 5,000,000 metric tons.

The Laryma nickel-iron mine resumed operation after being closed for five years. The Rhodiani chromite mine also resumed production.

Greek Production of Ores, Metals, and Minerals in Metric Tons in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*[1]
Barite	153,885	127,000	125,000
Bauxite	856,205	1,100,000	1,250,000
Sulphide ores	314,212	320,000	330,000
Magnesite	88,670	90,000	98,000
Manganese	20,000	19,500	20,000
Nickeliferous-iron ore	54,649	—	—
Iron ore	278,659	260,000	280,000
Iron pyrite[2]	162,876	164,000	165,000
Emery	7,000	7,200	7,500
Chromite ore	65,514	65,000[1]	72,000

1. Estimated. 2. Ore and concentrate.

Italy

Compared with 1959, Italy's mining production generally increased except for a few products—sulphur, manganese ore, etc. during 1960. 1960 also set an all-time record for Italy's industrial production. As a consequence, too, the international demand for raw materials had an influence in promoting the increase in the ore and mineral production.

In the mercury producing area of Monte Amiata some 100 miles north of Rome, the stockpile was reduced from 80,400 flasks on December 31, 1959 to 67,407 on December 31, 1960 in spite of the production (about 10,000 more than in 1959) which almost reached the

1958 level. Exploration from the deeper levels of the Abbadia San Salvatore mine and from outpost drilling went on successfully and new substantial reserves were added to the known ones. Interesting results of underground explorations are also reported for the Bagnore area, owned by a subsidiary of Italian Edison Company.

Pyrite stockpiled at the western Tuscany mines was also reduced from 226,000 to 172,000 tons during the year. Montecatini Company, which owns the largest producing mines of the area, plans the construction of a big centralized plant for burning the ore. This would allow the company to export sulphuric acid and iron pellets obtained by treating the ashes of the pyrite combustion. To secure adequate pyrite reserves, the company started an exploration campaign by surface drilling and underground shafts. First reported results seem satisfactory. Underground development of the large Monte Argentario pyrite-magnetite ore body continued. One of the two shafts, started in 1959, reached the impermeable Paleozoic schists below 600 feet of cavernous limestones without noticeable water influx and this will allow reaching the ore body from dry ground.—The actual depth of the shaft is about 1,100 feet (about 600 below sea level).

Lead and zinc production in Sardinia was still low due to the unfavorable market conditions and also to the grades of several mines which decrease with depth. In order to face competition with other countries, a large program of exploration, mechanization, and improvement of metallurgical plants was started by a group of producers. This program will involve a total expenditure of more than $25,000,000.

New flotation plants were installed at the Sedda Moddizzis and Montevecchio mines. In northern Italy production increased at the Solafossa mine, where a new sink and float concentrating section was installed with a 500 ton per day capacity. The plant will eliminate about 50 percent of the waste limestone and dolomite from the ore ahead of flotation.

No major results come from the few uranium exploration permits which were active in 1960.

The tin-bearing lodes reported as promising and explored in 1959 (Flumini area, Sardinia) were finally recognized as non-commercial and all exploration dropped.

Large increases were made in the production of fluorspar, barite, talc and asbestos, due to the growing demand from foreign countries.

A new milling and ventilating plant for barite was built near Cagliari (Sardinia) by the Edemsarda Co. The mill produces some 50,000 tons per year of "Mudbar" (barite for drilling muds).

Large bauxite reserves seemed proved by drilling in the Alghero area, Sardinia. Bauxite is interbedded in flat, massive Mesozoic limestones and should be mostly mined underground. The ore, unlike most bauxites of the Mediterranean belt, is white and low in iron.

Sicily's potash salts production, (mostly kainitic ore) increased from 75,000 in 1959 to over 330,000 tons in 1960, due to the gradual completion of the San Cataldo mine (Montecatini Co.). The smaller St. Caterina mine ("Sincat" Co.) also reached the production stage. Trinacria's large Pasquasia mine is expected to reach the full production level in early 1961. Other mines (Montedoro of the Salsi Co. and Corvillo of the Trinacria Co.) were in the development stage.

Native sulphur production decreased again in 1960; a certain amount (56,000 tons) of the flotation concentrates is directly marketed, both smelted and without smelting, for agricultural uses. Remarkable efforts were made by the government agency Ente Zolfi Italiani to improve the productivity of the sulphur mines. South African and German consulting groups were engaged in studies for improvement of the technical conditions of the mines.

Italian Metal and Mineral Production in Metric Tons in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Bauxite	299,030	301,129	317,986
Antimony ore	636	843	1,233
Arsenic ore			3,759
Iron ore	1,282,656	1,238,390	1,245,385
Manganese ore	43,373	52,013	46,919
Mercury ore	294,210	245,714	294,259
Lead conc.	94,098	84,242	79,203
Zinc conc.	276,602	274,498	277,254
Copper conc.	3,070	2,662	2,246
Asbestos fiber	35,949	43,500	51,402
Barite	93,159	95,000	116,183
Fluorspar	139,976	154,500	151,912
Potash salts	60,585	75,216	331,508
Pyrite	1,513,716	1,532,140	1,554,280
Sulphur	161,211	122,000	80,880
Sulphur ore, milled			21,268
Graphite	4,010	3,100	3,718
Gold, metal	0.127	0.099	0.103
Silver, metal	41,500	28,624	29,386
Talc	108,754	105,000	122,419
Aluminum, metal	64,050	100,440	83,642
Lead, metal	48,000	44,372	43,608
Zinc, metal	71,335	73,950	79,239
Mercury	2,024	1,540	1,902

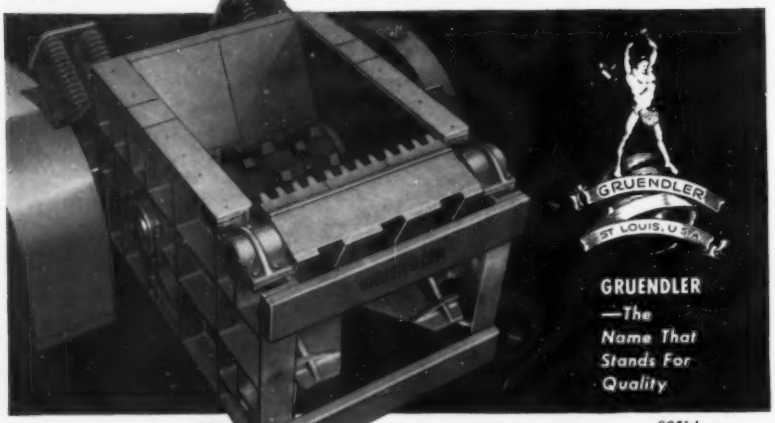
German Democratic Republic

Official figures for eastern German Mining and Metallurgical Production Covering the Years to 1959 Were Released With 1960 Estimated as Shown in Table

Commodity	*1956*	*1957*	*1958*	*1959*	*1960*[1]
Iron ore[2]	1,757,000	1,478,000	1,506,000	1,599,000	1,550,000
Copper ore[2]	1,350,000	1,393,000	1,457,000	1,572,000	1,600,000
Potash salts[2, 3]	1,556,000	1,604,000	1,650,000	1,644,000	1,650,000
Pyrites[2, 4]	54,000	54,000	52,000	50,000	50,000
Pig iron[2]	1,574,000	1,663,000	1,775,000	1,898,000	1,900,000
Steel ingots[2]	2,740,000	2,895,000	3,043,000	3,207,000	3,250,000
Sulfur[2]	94,236	101,798	106,359	107,856	108,000
Alumina[5]	54,988	49,658	51,484	55,302	58,000

1. Estimated. 2. Metric tons. 3. K_2O. 4. Sulphur content. 5. Calcined Al_2O_3 content.

GRUENDLER BUILDS BIGGEST MODERN SINGLE ROLL CRUSHER



Weight: 135,000 pounds. Capacity: 1500-3000 TPH. View shows corrugated breaker plate and pyramidal teeth on manganese steel roll segments. Teeth engineered to fit the crushing problem.

Designing and building this 65 ton, single roll crusher was a "natural" for Gruendler. For three quarters of a century, Gruendler has been pre-eminent in designing and manufacturing crushers, pulverizers and material reduction equipment.

OTHER PRODUCTS:

- Center Feed Impactor for Secondary Crushing
- The Double-Pitman Jaw Crusher
- Feeders,—Apron Feeders —Plate Feeders—Grizzly Feeders and Low Level Feeders for Gruendler Portable Units.

GRUENDLER BENEFITS:

• Economy • Long Life • Efficiency • Performance

For wet, frozen or sticky material of semi-hard or friable nature . . . specify Gruendler.

Send for Catalog No. 702A to

GRUENDLER CRUSHER AND PULVERIZER CO.

2915 North Market Street, St. Louis 6, Missouri

Norway

Mine production volume in 1960 recovered from the slump in 1958–1959 and was, for most products, back on the high level it occupied in the record year 1956. Production value is considerably less due to the lower metal prices, and has decreased from about $40,000,000 in 1956 to $30,000,000 in 1960.

In the different minerals, the most spectacular gains were made in pyrite ore, graphite, and coal production volumes.

A/S Titania's new 1,000,000 annual ton ilmenite ore mine and mill at Tellnes was started in October 1960. This is the most important development in the Norwegian mining industry in the last eight years.

The nepheline plant at Stjernøy will start early in 1961 with a production of 45,000 tons a year. Christiania Spigerverk which owns the plant decided to expand it to 90,000 tons a year.

Exploration drifts and shafts have been started at the Kautokeino copper deposits in the north, and at the Tverrfjellet complex sulphide deposit in central Norway. The cross cut at Joma in the Grong district reached high grade copper ore. This deposit may turn out to be one of the major copper ore bodies in Europe. Plans for mining will not be worked out before the exploration program has been carried through to completion.

A number of other exploration programs were in progress all over the country, but had not led to any announced project decisions at year's end.

The smelting industry showed impressive gains in production volumes for iron and steel, ferroalloys, aluminum, and magnesium, despite the fact that power shortages in the last months of 1960 forced many plants to cut production heavily.

Further expansions of existing plant capacities were in progress. It has also been decided to build a ferrosilicon plant in Troms and a calcium carbide plant at the Trondheimsfjord. Many other projects are under consideration, especially in the aluminum field, but the deciding factor will be the rate of hydroelectric power development.

Poland

Mine and metal production have made important strides in Poland in recent years.

Both hard and soft coal are mined and are the largest segment of the mining industry. Almost all bituminous coal is mined underground and new mines, particularly for coking coal, are being developed. At year's end 13 new mines were being developed and start of two additional mines was scheduled for 1961. The lignite mines are all open pits; several have annual outputs of more than 1,000,000 tons. The Turow mine has a

Mine and Smelter Production in Metric Tons in Norway From 1957 Through 1960

Commodity	*Average grade percent*		*1957*	*1958*	*1959*	*1960*[1]
Iron ore & conc.	64.5	Fe	1,548,000	1,601,000	1,546,000	1,650,000
Ilmenite conc.	44	TiO_2	210,000	212,000	227,000	234,000
Pyrite ore & conc.	—		844,000	793,000	744,000	830,000
Copper conc.	21	Cu	29,700	30,000	28,900	29,000
Zinc conc.	52	Zn	14,100	17,500	19,400	21,000
Lead conc.	64	Pb	1,400	3,400	3,800	4,000
MoS_2 conc.	93	MoS_2	317	392	410	440
Columbium conc.	50	Cb_2O_5	193	286	290	310
Graphite conc.	80	C	5,700	4,500	4,600	6,000
Pig iron	—		245,000	260,000	338,000	380,000
Steel ingots	—		350,000	371,000	426,000	480,000
Ferrosilicon	45	Si	151,000	124,000	127,000	170,000
Aluminum			96,000	121,000	146,000	165,000
Magnesium			8,600	9,200	9,700	13,000
Copper			15,800	17,600	19,100	21,000
Copper matte	35	Cu	13,700	13,900	11,300	11,000
Nickel			21,100	23,600	26,000	30,000
Zinc			48,000	46,000	49,000	45,000
Sulphur			97,000	91,000	78,000	70,000

1. Estimated.

"RELIANCE"

attachments for wire ropes are used throughout the world for mining and industrial purposes.

Aerial Tramway Coupling

For the safe attachment of hoisting ropes to cage or skip, the suspension and tensioning of guide ropes, etc., for aerial tramways & for all rope anchorage and manoeuvring, use "RELIANCE" equipment.

Reliance Rope Cappel

Our wire rope attachments have served the mining industry for more than 50 years. Complete suspension assemblies for mine cage or skip, & for guide ropes, designed and supplied.

Reliance wedge-type cappels and other Reliance fittings are fully described in our brochure. Send also for our booklet on guide rope installation.

RELIANCE ROPE ATTACHMENT COMPANY LIMITED

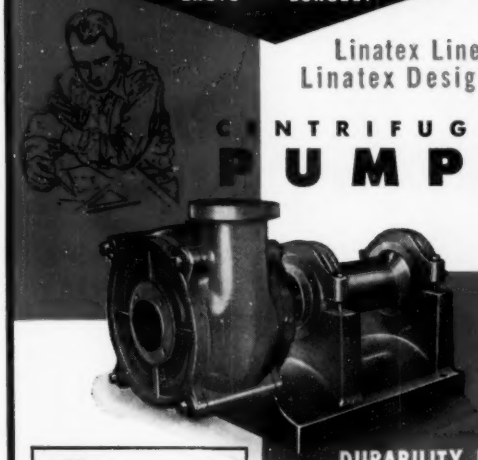
Cables: 'Relyco' Cardiff.

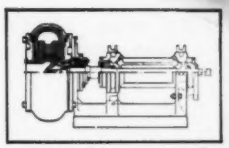
27 PARK PLACE, CARDIFF, GREAT BRITAIN.

LINATEX LASTS LONGEST

Linatex Lined Linatex Designed

CENTRIFUGAL PUMPS





(SIZES 1" through 12")

DURABILITY PLUS

...by using the same longer lasting LINATEX that adds 5 to 6 times to the life of conveyors, chutes, launders, hoppers, etc.

COLD BONDED—JOB SITE APPLICATION

For information and quotations please write:

LINATEX CORPORATION OF AMERICA

P.O. DRAWER "D". STAFFORD SPRINGS, CONN.

production goal of 17,000,000 and the Konin mine has a goal of 10,000,000 annual tons.

Iron ore reserves are small and the loamy siderite ore mined in the Czestochowa district contains only about 30 percent iron.

Zinc and lead have been mined for centuries in the Byton, Chrzanow, and Olkusz districts where the ore averages 6.0 percent zinc and 1.5 percent lead. Recent discoveries are lower grade and were made in the Tarnowskie Gory and Olkusz districts. In order to increase output a new smelter will be erected at Miasteczko Slanskie to treat $ZnCO_3$ residues and low grade ore. A new type drum furnace will be built.

The most rapid mineral development has been copper, following the 1958 discovery of copper ore at Glogow. The mineralized beds are steeply dipping, but reserves are large so that all the local consumption can be supplied. The copper mines at Boleslawiec and Zlotoryja have produced Poland's copper to date from very low grade ore.

Geological exploration has located large sulphur deposits in Miocene sediments on both sides of the Vistula River in the Tarnobrzeg district. First ore was mined in 1960 and output in a few years will be ample for all domestic consumption with any surplus available for export.

Salt is produced from brines pumped from wells in large enough quantities to make large exports possible. Potassium salts will be recovered from these brines in the future.

Production of Minerals and Metals in Poland in 1959 and 1960 in Metric Tons

Commodity	*1959*	*1960*
Iron ore	2,014,000	2,382,000
Zinc and lead ores	2,156,000	2,461,000
Copper ore	1,538,000	1,759,000
Sulphur	17,000	27,000
Pig iron	4,374,000	4,563,000
Aluminum	22,300	26,000
Zinc	168,000	175,500
Copper	17,500	21,700
Lead	38,700	39,700

Portugal

Low prices for metals made mining difficult for many Portuguese mines in 1960. Most of the tungsten mines were inoperative, but several reopened when the price reached 150 escudos per short ton unit. When the price dropped near year's end several of these were forced to close.

Prospecting for tin continued at a high level. A large mill was built at the Montesinho mine; exploration was favorable at the Serra de Bois, Guarda; and reserves were increased at Marao. It is hoped that an agreement will be reached between the ore producers and the consuming metallurgical plants to assure a steady local use favorable to both parties.

Pyrite mining, most important from a tonnage standpoint in Portugal, continued at an increased rate, but faces marketing difficulty in competition with byproduct French sulphur.

Only one gold mine, Jales, remains in operation. However, the Serviço de Fomento Mineiro was carrying out an extensive investigation of the old gold mining districts in hopes of finding unknown deposits. Preliminary results were not optimistic.

With increased Portuguese steel production, the outlook for the iron mines is brighter. The National Steel Works will use iron-manganese ore from the Cercal mines in Alentejo, and hematite from Moncorvo. The Vila Cova, Marao, steel plant increased output of its electric furnaces. It is hoped that a Krupp-Renn plant will soon be built at Moncorvo to use the hematite ores mined locally.

Plans have been made to restart the Raiva lead-zinc silver mine in 1961.

Production of Metals and Minerals in Metric Tons in Portugal in 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Arsenopyrite	6,438	1,931	30,941
Beryl	147	37	24
Cassiterite[1]	1,953	1,639	928
Columbite-tantalite	24	18	1
Galena[2]	1,473	99	39
Hematite	135,152	152,638	191,789
Kaolin	59,745	44,329	46,610
Magnetite	96,980	89,085	111,240
Manganese ore[3]	4,975	6,988	7,409
Pyrite	598,166	631,546	654,922
Scheelite[1]	34	53	105
Wolframite[1]	1,681	2,022	2,378

1. 65 percent Sn. 2. 65 percent Pb. 3. 42 percent Mn

DRILL WITH VAREL

Daniel W. Varel

SERIES of REPLACEABLE CONE & BLADE BITS

for hard formations
V1—VH1

for soft formations
V3—VH3

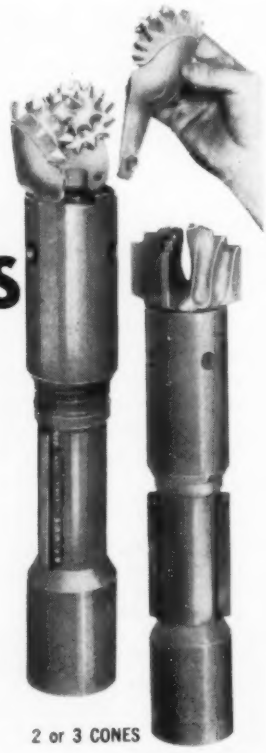
for medium formations
V2—VH2

for fast drilling
V4—VH4

CONES and BLADES — 2- 3- & 4-WAY
ALL FIT INTO THE SAME SUB

DWV SERIES IS A VAREL EXCLUSIVE — Write today for illustrated brochure, size range and price list.

VAREL'S COMPLETE LINE OF ROTARY DRILLING BITS
2- & 3-CONE ROTARY ROCK BITS — BLADE BITS
DIAMOND DRILLING & CORING BITS



2 or 3 CONES

2- 3- or 4-WAY INSERTS

VAREL MFG. CO. 9230 Denton Drive • Phone Fleetwood 1-6487
P. O. Box 13146 • DALLAS 20, TEXAS

Spain

Spanish mining and metallurgical industries had a very favorable year in 1960. Over-all increase in output is estimated at 3.4 percent over 1959 with major increases in iron ore to 5,167,000 metric tons, which was about the same as the record year of 1957. Spanish steel plants consumed an increased tonnage and export sales, especially to England and West Germany, were up sharply. Several small mines pooled facilities and others started to modernize equipment. The Compania Minera Siderurgica de Ronferrada was building a new pier at Vigo with a daily capacity of 20,000 tons into 40,000-ton ships.

Mercury production by Minas de Almaden increased sharply in the later part of the year as increased tonnages were furnaced in the new Pacific furnaces. Total output was about the same as in previous years.

Potash production increased to an estimated 287,000 metric tons of K_2O equivalent. Further increases are planned as Potasas de Navarra signed an agreement for technical assistance with the French firm Mines Domaniales de Potasse d' Alsace to increase output to 5.0 tons of 60 percent K_2O per man shift.

Lead and fluorspar exports increased, but production of lead decreased due to the lower domestic demand.

Compania Espanola del Zinc produced 20,000 tons of electrolytic zinc and is doubling plant capacity.

Aluminum output reached an all time high of 29,500 metric tons. With two new plants at Coruna and Vigo scheduled for early production, total Spanish output will reach 60,000 annual tons. Thus Spain became a net exporter—20,000 tons in 1960.

Foreign capital was very active in expanding metallurgical plants and modernizing others during the year so that increased mine production will be needed in the future to supply ore for these plants.

Production of Ore, Metals, and Minerals in Spain in 1959 and 1960 in Metric Tons

Commodity	*1959*	*1960*[1]
Iron ore	4,609,000	5,167,000
Pyrite and chalcopyrite	2,120,000	2,107,000
Zinc	153 000	168,000
Lead	111,000	104,900
Potash as K_2O	272,000	287,900
Potash, sylvinite	1,596,000	1,700,000
Barite	25,570	26 300
Kaolin	115,964	120,000
Fluorspar	89,193	100,000

1. Estimated.

Sweden

The year 1960 was a good production year for Swedish mines. Both iron ore production and export set records. Iron ore production reached 21,320,000 metric tons, and export was 20,000,000 tons.

SULPHIDE ORES: Hydraulic filling was introduced as a standard underground method at the Kristineberg and Rävliden district mines of Bolidenbolaget. At the Garpenberg mine this method was used more frequently.

In the Vassbo mine, production was started according to plan. Annual production reached 150,000 tons of 6.0 percent lead ore. By applying autogenous grinding in the new plant, a considerable reduction in cost was obtained, both in this and other Boliden mills.

In the Adak district, which is run by the Bolidenbolaget, a new central hoisting shaft was completed and the mill capacity was increased from 170,000 to 250,000 tons of ore per year. Automation at the Adak mill cut down the control operation to one man per shift from feeding of the rod mill up to and including concentrate treatment and waste haulage.

Exploration for copper, zinc, and iron pyrite in Udden and Näsliden began. The deposits will be investigated to a depth of 400 meters. During 1961, investigations at the Langdal mine will continue from a depth of 300 meters in the lead-zinc ore, previously found to contain precious metals, in order to ascertain whether ore deposits are to be found at greater depth.

IRON ORE MINES: The production of iron ore at LKAB mines in Norrbotten increased during 1960 by 2,200,000 tons to 15,715,000. At Kiruna, 60 percent of the 12,000,000 tons was from underground mining. Also at Kiruna, a central concentrator with two additional shafts was being built, increasing the annual capacity to 15,000,000 tons. Open pit mining in Kiruna was nearly finished, but at Zenobia open pit mining was resumed.

Diamond drilling in the Svappavaara district continued and trial mining on a small scale was carried out.

At Malmberget, which had a total production of 3,690,000 tons, 251,000 tons were concentrate and 163,000 were pellets. The new concentration plant at Vitafors, with a mechanized concentrate storage area, commenced operations. The capacity of the pelletizing plant was increased from 120,000 to 350,000 tons of pellets per year.

Tuolluvaara Gruv AB: A production record of 500,000 tons was reached during 1960. Shaft sinking reached a depth of 513 meters to make a drift connection possible to the new material and manway shaft, which is now in use. The hoist capacity is a load of six tons and 36 men at one time. A mud clarifying dam with a volume of 125,000 cubic meters was under construction. Diamond drilling has exposed some unknown ore deposits.

TGO—Trafikaktiebolaget Grängesberg-Oxellösund: About 70 percent of the record production, 1,874,000 tons of ore at Grängesberg were mined during the last part of the year by means of block caving. Mechanization of the haulage in layers and blocks has reached a proportion of 90 percent. Block caving and improved yield in the sorting plant increased the concentrate grade to about 70 percent iron.

Production of Metals and Minerals in Sweden in Metric Tons for 1958, 1959, and 1960

Commodity	*1958*	*1959*	*1960*
Iron ore	18,600,000	15,200,000	21,320,000
Pyrite	333,553	380,000	412,882
Lead conc.	58,751	60,000	76,164
Zinc conc.	122,832	125,000	130,307
Copper conc.	76,000	74,000	72,679
Tungsten, conc.[1]	600		355
Fluorspar	2,891	2,850	2,900

1. As 60 percent WO_3.

By installing two additional Stripa sink-float vessels, hand picking was entirely eliminated. Humphreys spirals were installed for recovering fines.

By rebuilding the apatite leaching plant with new leaching towers and filters for washing, the surplus acid was reduced considerably and a concentration of the leaching solution obtained.

Full production of 1,000,000 tons of ore and 400,000 tons of iron concentrate was reached at Stråsa.

Ställbergsbolagen: The concentration plant in Stripa was being built to use a rod mill, a ball mill, and Humphreys spirals. The Polheim mine was being equipped for hoisting about 70,000 tons of manganiferous iron ore. Shaft sinking reached a depth of 250 meters. After coarse separating, the final treatment of the rough concentrate will take place at Ställberg.

Dannemora: An increase in production is estimated during 1961 to total 315,000 tons of lump ore and 60,000 tons of concentrate from 650,000 tons of manganiferous iron ore hoisted.

Bispberg: Shaft sinking was started underground from the 510 meter to the 850 meter level for driving exploration drifts on a level to be established at 810 meters.

Norbergs Grufförvaltning: During 1960 a break-through was made in the conveyor drift from the 350 meter level to the mill at Bålsjön, and the 1,170 meter long and 700 millimeter wide rubber-covered steel conveyor was under construction. The maximum capacity of the conveyor is estimated at 260 tons per hour. It will be in operation during 1961. The new mill at Bålsjön, which was started at half capacity, consists of two four-meter-long by three-meter-diameter rod mills, as well as separators and shaking tables. An additional Stripa sink-float unit was installed in the flotation plant.

AB Statsgruvor: The new sorting and concentration plant at Mimer, Norberg, was started during 1960. The new plant, which has two rod mills and magnetic and flotation separation, will have an estimated annual production of 150,000 tons of concentrate. The crushing station is located at a depth of 275 meters, to which an 800-meter-long conveyor runs from the Prost mine and the Stor mine. In the 60-meter-high shaft headframe there is a passenger hoist and a rock hoist, both with counterweights.

In Håksberg, a new crushing station was installed at the 350 meter level, with skip loading at 400 meters.

Stora Kopparbergs Bergslags AB: The new plant in Grängesberg equipped with Humphreys spirals was put in operation during the year, and reached the anticipated annual capacity of 300,000 tons of iron concentrate. At Blötberget, the shaking tables will be exchanged for Humphreys spirals during 1961. Production will remain unchanged. At Vintjärn, sinking of the new hoisting shaft to 400 meters depth will be reached during 1961. A planned mill will use autogenous grinding. Rope guides will be used in the new shaft. At Ramhäll, shaft sinking is going down to 600 meters depth. In the Gräsberg district the old Valsarf shaft is being sunk to 330 meters, where prospecting will be carried on. At Burängsberg an exploration shaft will be sunk to 300 meters depth.

Riddarhyttan: The new central mill at

IT'S A FACT*

*Longyear offers you 70 years experience in contract drilling

Experienced and capable crews, plus modern methods and equipment, combine to offer you prompt, efficient Contract Drilling Services. Quotations furnished promptly and in strict confidence. For more information, contact our nearest office.

E. J. LONGYEAR CO.

Longyear

Longyear Building, Minneapolis 2, Minn. — 1533 W. Mulberry Dr., Phoenix 15, Ariz.

P. O. Box 245, Max Meadows, Va. — P. O. Box 18, Poplar, Wis.

ADV-174A

the Bäcke mine is scheduled to be in operation at the end of 1961. 400,000 tons of ore per year will be hoisted to double production.

Kantorp: Construction of the new headframe at the new central shaft was completed. At Stav, the shaft was sunk to 285 meters depth. A newly-discovered ore body was investigated between the 123 and 60 meter levels. About 1,000,000 tons of magnetite-hematite ore of quartz-striped type was developed.

Yxsjöberg: A new rock hoist and new skip loading equipment were installed at the headframe of this scheelite mine during the year. The new ASEA hoist is the first in the world to have low frequency braking regulated in a closed system.

Yugoslavia

1960 was a record year for mining, smelting, and other industrial production in Yugoslavia.

Lead production increased 4 percent. The Trepca smelters, Kosmet, produced 74,277 tons of refined lead (71,801 in 1959). Lead concentrates from all other mines in Yugoslavia, except from Mezica, are smelted here. Smelting is done on 10 Newnam hearths and in two blast furnaces. The Trepca lead smelters will be reconstructed; hearth-smelting will be abandoned. A storage battery plant, a sulphuric acid plant, an electrolytic zinc plant for 18,000 tons per year, and a fertilizer factory will be built in the future.

The Mezica smelters, Slovenia, produced 14,866 tons of refined lead (13,594 in 1959). The lead was produced in a blast furnace and in two short-drum furnaces.

Nearly all lead-zinc mines increased their concentrate production. The Zletovo mines, Macedonia, are developing the Sasa mines near the Bulgarian border, where 5,000,000 tons of ore containing 10 percent lead plus zinc have been indicated. Concentrate production is expected in two to three years. The reopened Roman mines at Srebrenica-Sase, Bosnia, will start regular production in 1961 at a rate of 21,000 tons of zinc and lead concentrates per year. The new mine at Kisnica, Kosmet, has 10,000,000 tons of Pb-Zn-Ag ore. Ore output started, and a flotation plant for 2,000 tons of ore per day will be built in 1961.

The production of zinc increased more than 12 percent compared with 1959. The zinc smelters at Celje, Slovenia, produced 19,696 tons of zinc (18,122 in 1959). More than half was converted in the same works to zinc oxide and zinc sheet. The new FluoSolids roasters and the second sulphuric acid plant at Celje will soon start operations. The electrolytic zinc plant at Sabac, Serbia, produced 16,239 tons of zinc (13,829 in 1959). This plant is being enlarged; the production will be doubled in one or two years. At Sabac electrolytic cadmium is also produced at a rate of 30 tons per year.

Copper ore output increased seven percent, but the blister-copper production at Bor, Serbia, remained on the level of 1959. All copper was electrolytically refined, byproducts are silver, gold, and selenium. The reconstruction of the Bor smelters was nearly finished.

The Majdanpek mine and flotation plant are ready for production. Some 6,000 tons of copper are expected from Majdanpek concentrate in 1961.

Pyrite concentrate production increased 44 percent. Bor delivers approximately 80 percent of the pyrite, Trepca the rest.

Antimony production at Zajaca, Serbia, increased six percent. Further increase is expected due to new ore findings.

Mercury production at Idria, Slovenia, increased again by five percent and was near the 500-ton level. The 250-ton-per-day rotary kiln was under construction; production will start in mid-1961.

Bauxite output increased 26 percent and exceeded 1,000,000 tons. Over 80 percent was exported. Bauxite is mined in Istra, Dalmatia, Bosnia-Hercegovina, and Montenegro, several high grade ore bodies were discovered.

Alumina production increased 18 percent. The Kidricevo works in Slovenia produced nearly 56,000 tons. The factories at Ljubljana-Moste, Slovenia, and Lozovac, Dalmatia, produced the rest. The Kidricevo alumina plant was being reconstructed; the continuous Bayer-Péchiney process will be used.

Metric Tons of Metals and Alumina Produced in Yugoslavia in 1939, 1958, 1959, and 1960

Metal	*1939*	*1958*	*1959*	*1960*
Refined lead	10,651	84,281	85,395	89,143
Zinc	4,918	31,248	319,51	35,935
Blister copper	41,643	33,672	35,251	35,729
Electrolytic copper	12,463	29,905	31,567	35,053
Antimony	1,500	1,665	2,281	2,410
Mercury	378	423	460	485
Aluminum	1,795	21,681	19,245	25,070
Bismuth	0	77	91	105
Silver	1	117	88	94
Alumina	7,141	54,000	57,000	67,000
Steel	235,000	1,119,000	1,299,000	1,442,000

1. Estimated.

Metric Tons of Ore Mined in Yugoslavia in 1939, 1958, 1959, and 1960

Ore	*1939*	*1958*	*1959*	*1960*
Lead-zinc	775,000	1,796,000	1,831,000	1,920,000
Copper	984,000	2,268,000	2,228,000	2,370,000
Antimony	18,963	75,524	96,138	109,508
Bauxite	719,000	733,000	815,000	1,025,000
Chromite	44,852	113,569	107,016	100,582
Manganese	5,656	10,036	8,084	13,314
Pyrite concentrate	78,000	331,000	290,000	417,000
Iron	667,000	1,119,000	1,299,000	1,442,000

1961 Directory of Major United States Mining Operations

MINING WORLD

ABBREVIATION CODE USED IN THIS DIRECTION ONLY

Accountant ..... acct
Assistant ..... asst
Brothers ..... bros
Chairman ..... chmn
Chemical ..... chem
Chief ..... ch
Company ..... co
Concentrator .... concen
Consolidated ..... consol
Corporation ..... corp
Creek ..... cr
Development ..... devel
Director ..... dir
Directory of Mines .. DM
District ..... dist
Division ..... div
East ..... E
Electrical ..... elec
Engineer ..... eng
Flotation ..... flot
Foreman ..... frm
General manager . gen mgr
Geologist ..... geol
Gravity ..... grav
Heavy media .. heav-med
Hydraulic ..... hydraul
Incorporated ..... inc
Limited ..... ltd
Manager ..... mgr
Mechanical ..... mech
Metallurgist ..... met
Mile(s) ..... mi
Milling ..... mlg
Mining ..... mng
No Production . No Prod
North ..... N
Operations ..... oper
Operator ..... op
Owner ..... own
Partner ..... part
President ..... pres
Production ..... prod
Purchasing agent purch agt
Secretary ..... sec
South ..... S
Superintendent ..... supt
Surveyor ..... surv
Treasurer ..... treas
Underground ... undergr
Vice president ..... VP
West ..... W
Yearly ..... yrly

A CAREFUL SURVEY OF SOME 4,050 MINING and allied processing operations, both active and dormant, was the basis of this list of United States mining operations. While MINING WORLD cannot guarantee 100 percent accuracy for this directory, it believes that the list is the best such reference available to the mining industry from any single source.

FOR THE GREATEST POSSIBLE UTILITY operations are listed alphabetically by state. Listings are carried under the name of the operating company, owner, mine, or individual operator, according to the wishes of the parties concerned. In cases where properties are commonly known by more than one name, cross references were used where possible. Major companies have more than one listing. Properties and key personnel are listed by states in which the mines and/or processing plants are located. There is a cross reference to company executive headquarters and to all other states in which the company operates.

QUESTIONNAIRE FORMS covering major operating details and personnel were mailed over a period of six months. Where information supplied by the operator or owner was not complete, supplementary data was obtained from field reports compiled by staff members, records furnished by the MINING WORLD news bureau, and information from federal and state mining agencies, the United States Atomic Energy Commission, many state geologic departments, state conservation commissions, and state and regional mining associations. Special thanks are extended to the U. S. Bureau of Mines and its regional engineers for help in checking operating properties.

THE PROPERTIES WERE ALL ACTIVE and producing when surveyed except where "under development" and "No Prod" have been added. This latter means that no mining and/or shipments were made in the immediate past. It should be noted that there are many large and important mines listed here with the notation "No Prod." This is believed to be only a temporary situation due to low metal prices, strikes, or other reasons for curtailed operations. Many of these so listed mines are doing regular assessment work and the nuclei of official and management personnel are maintained. Many of these properties are being kept in good physical repair. Water is being pumped from the mines, and they can be placed back in operation within a very short time when management gives the go ahead sign. Totally inactive properties with no indication of future resumption of operation were deleted.

A SPECIAL NOTE ABOUT URANIUM COMPANIES. Only those uranium companies that are actually operating, developing and/or reportedly made uranium ore shipments in 1960 are listed in this directory. Although MINING WORLD contacted several hundred more former uranium companies than are listed on the following pages, only those which gave proof of actually being in the process of production, development, or exploration work were included.

MINING COMPANIES, MINE OPERATORS, etc., are listed in the state in which ore was actually mined. Headquarters of the company (producing unit) are then listed and address given even though in another state; which is often the case.

IF YOUR MINE WAS NOT LISTED in this year's directory, fill out the form below, tear it out of the book along the dashed line and mail it to MINING WORLD, 500 Howard Street, San Francisco 5, California, and your name will be added to the list receiving questionnaires for next year's directory section.

STATE	PAGE
Alaska	DM 2
Alabama	DM 3
Arizona	DM 3
Arkansas	DM 7
California	DM 7
Colorado	DM12
Connecticut	DM17
Delaware	DM17
Florida	DM17
Georgia	DM18
Idaho	DM19
Illinois	DM22
Indiana	DM23
Iowa	DM23
Kansas	DM23
Kentucky	DM23
Louisiana	DM23
Maine	DM24
Maryland	DM24
Massachusetts	DM24
Michigan	DM24
Minnesota	DM25
Mississippi	DM26
Missouri	DM26
Montana	DM27
Nebraska	DM30
Nevada	DM30
New Hampshire	DM32
New Jersey	DM32
New Mexico	DM33
New York	DM35
North Carolina	DM36
Ohio	DM37
Oklahoma	DM38
Oregon	DM38
Pennsylvania	DM39
South Carolina	DM39
South Dakota	DM39
Tennessee	DM40
Texas	DM41
Utah	DM41
Vermont	DM45
Virginia	DM45
Washington	DM45
Wisconsin	DM47
Wyoming	DM47

ATTENTION: New Mine Operators—Unlisted Mine Operators

LIST YOUR MINE IN THE 1962 MINING YEARBOOK MINE DIRECTORY SECTION

To receive questionnaire for listing your mine, complete and MAIL THIS FORM TO: Editor, MINING WORLD
500 Howard Street
San Francisco 5, California

Your Name .....

Your Address .....

Your City ..... **State** .....

Mining Company .....

CATALOG, SURVEY & DIRECTORY NUMBER, 1961

DM-1

ALASKA

AGOFF, HARRY
c/o Prince Cr Mng Co, Flat
PLACER, Prince Cr, Iditarod dist, nonfloat, Au

ALASKA EXPLORATION & MNG CO
Box 136, Pullman, Wash
Pres: Frank P Busch
VP: Harvey Moys
Sec-Treas: Raymon Smeltz
BIRD CREEK PLACER, Talkeetna
(Under lease to: Trepte, Blair Bro and Barney)

ALASKA METALS MNG CO
Box 965, Fairbanks
STEPOVICH & GOLBERT PROPERTIES
LODE MINES, Gilmore Dome, Fairbanks dist, WO_3
No Prod

ALASKA MINES & MINERALS, INC
Red Devil
Pres Ray Wolfe
VP: Robert F Lyman
Sec-Treas: H R Heard
RED DEVEL MINE, Red Devil, undergr, Hg
Gen Mgr: Robert F Lyman
Eng Roger A Markle
Geol: Gordon W Herreid
Prod: 30 tons
DE COURSEY MINE, 20 mi N of Crooked Cr, Hg
No Prod
WILLIS GROUP, 3 mi NW of Red Devil
No Prod

ALASKA PACIFIC CONS MNG CO
519 Colman Bldg, Seattle, Wash
Pres: V A Montgomery
VP & Gen Mgr: Wm M Stoll
Sec: Carl W Eiseman
INDEPENDENCE MINE, 35 mi N of Wasilla, undergr
No Prod
100-TON FLOT-AMAL MILL
No Prod

ALDER CREEK MNG CO
Box 1999, Fairbanks
Part: Martin Sather, Jr
PLACER, 34 mi N of Fairbanks, Au

ALLUVIAL GOLDS, INC
Coal Creek
Pres: Ernest N Patty
Mgr: Dale F Patty
Dirs: Walter Seligman, E D Bull
Mrs A D McRae
PLACER on Woodchipper Cr, Circle dist, Yukon riv region
4 ft dredge, Au

ANDERSON, ELLIS
Chandalar
PLACER, Yukon River, Chandalar Dist, Tobin Creek Au, Ag

ANDERSON, PETE
c/o B F Twitchell, Takotna,
PLACER, Yukon River, Innoko Dist, Ganes Creek Au, Ag

ARCTIC ALASKA ENTERPRISES
c/o John Sheldon, 1314 6th Street, Fairbanks
KAWALITA CLAIM, lode, Au, Ag

ATLAS MINES
Box 105, Nome
PLACER, Seward Peninsula Kougarok Dist, Dahl Creek Au, Ag

BEAR CREEK MNG CO
NWest Dist Offc: W 917 Mallon Ave, Spokane, Wash
NW Dist Geol: R D Hutchinson
In Chge of Alaska Oper, Except Ruby Cr: George A Moerlein, 1413 Valarian, Anchorage
RUBY CREEK MINE, Cu
Under devel

BEN CREEK PLACERS
Eagle
MINE, on Ben Cr, about 100 mi downriver from Eagle, placer, Au, Ag
Asst Gen Mgr: James H Hansen
Under devel

BELANGER, GEORGE & CAMERON, JACK
Box 1771, Palmer
PLACER, Copper River, Nelchina Dist, Albert Cr Au, Ag

BITTNER, PAUL
Central
PLACER Deadwood Cr, Circle dist, hydraulic, Au, Ag

BLISS & SONS
Ungalik
PLACER, Bonasa Cr dragline-dozer, Au

BROCKWAY, JOHN & ELLIS, SID
2550 E St., Bellingham, Wash
COBAL MINE, SE Alaska, Chicagof Dist, undergr, Au, Ag
Under devel
5-TON PILOT PLANT at 500' level
No Prod
(see Wash)

CANYON CREEK MNG CO
Aniak
Gen Mgr: Jens A Kvamme
PLACER on Canyon Cr, Aniak dist, Kuskokwin R reg, dozer sluice plate-hydraulic, Au

CARSTENS, HEINE, C & DELTA
Alaska Co, Central
PLACER, Portage Cr, Circle dist, Au

CHAPPELL, OLIVER L.
Wiseman
PLACER, Yukon River, Koyukuk Dist, Nolan Cr Au, Ag

CHATHAM CREEK MNG CO
Box 64, Fairbanks
Berg, Twelten & Wickstrom
PLACER, Last Chance Cr, Fairbanks dist, Yukon R reg, dragline-dozer, Au

CORDERO MNG CO
131 University Ave, Palo Alto, Calif
Gen Mgr: J Eldon Gilbert
MINE, Aniak Dist, Hg
Under devel
(see Calif, Idaho, Nev)

DEGNAN MNG CO
Ophir
Own: J A Degnan
Caroline Degnan
PLACER, Yukon River, Innoko Dist, Esperanto Cr, Au, Ag

DELONG, RALPH
Box 114, Nome
PLACER, Seward Peninsula Nome dist, Au, Ag

DENALI PLACER CO
Box 539, Anchorage
PLACER, Valdez creek, Au, Ag

DICKMAN, ORVILLE J.
Teller
PLACER, Seward Peninsula-Port Clarence Dist.
Gold Run Cr, Au, Ag

DONLIN PLACERS
Crooked Creek
Own: Robert F Lyman
PLACER in Snow Gulch 19 mi N of Crooked Cr, Aniak dist, Kuskokwin Riv reg, dozer, Au
No Prod

ENGELHORN, FOREST & ORVILLE
Talkeetna
PLACER, Cook Inlet-Susitna-Yentna Dist, Au, Ag

FAR NORTH DEVELOPMENT CO, INC
1105 Shenandoah Dr, Seattle 2, Wash
Pres: John Bulleit
VP: Asa Martin
Sec-Treas: E L Dreitzler
Oper Part: John W Raymond & Frederick D Parker
PLACER, Candle, Au
Mgrs: Frederick Parker
John Raymond

FERN GOLD MNG CO
705 Peyton Bldg, Spokane 1, Wash
Pres: Joseph Drumheller
VP: Myrtle Woldson
Sec-Treas: L R Gordon
FERN MINE, Palmer, undergr, Au
Under devel; property under lease to Fritz Kalmbach, mining engineer
50-TON MILL, Palmer
(see Wash)

FLAT CREEK PLACERS
McGrath
Part: John E & Richard S Fullerton
PLACER, Flat Cr, Au, Ag
Prod: 2,000 cu yds

FOSTER MNG CO, INC
Box 246, Nome
Pres. Neal W Foster
MINE, Hannum Cr, Deering, open pit, Ag, Pb
Under devel

FOSTER, NEAL W.
Box 246, Nome
PLACER, Seward Peninsula-Fairhaven Dist, Cunningham Creek, Au, Ag

GATES & ROSANDER
Ophir
Part: T Rosander
PLACER, Yukon River-Innoko Dist, Bear Cr, Au, Ag

GOLD PLACERS, INC.
Coal Creek
Pres: Ernest N Patty
Mgr: Dale F Patty
Dirs: E B Bull &
Mrs A D McRae
Walter Seligman
PLACER, Circle dist, Au, 4 ft dredge
No Prod

GOODNEWS BAY MNG CO, INC
422 White Bldg, Seattle 1 Wash
Pres: Andrew O Olson
VP & Gen Mgr: Edward Olson
Sec: G D Connor
Treas: C J Johnston
GOODNEWS BAY PLACER
Platinum
Gen Mgr: Edward Olson
Asst Gen Mgr: John W Weeks
Mng Eng: R W Vinnedge, Jr

GRANITE LAKE MNG CO
Box 3-476, Anchorage
Pres: John H. Dryer
Sec: Lee Strickland
Purch Agt: Jack Merrington
GRANITE LAKE MINE, Granite Lake, undergr, Au
Gen Mgr: John H Dryer
Gen Supt, Mine Supt & Mine Eng: Jack Merrington
Geol & Mine Frm: Jim Martin
Mech Eng: Ed Ferguson
Prod: 5 tons
5-TON PILOT MILL, flotation, Granite Lake
Mill Supt: John Dryer

HANCOCK, K S
General Del., Haines
PLACER, SE Alaska, Juneau Dist, Au, Ag

HASSEL MNG CO.
Box 1071, Fair
PLACER, Ready Bullion Cr, Fairbanks dist, Au

HAVRILACK, HARRY F. MNG CO.
Rampart, Alaska
PLACER, Yukon River-Rampart Dist., Ruby Cr, Au, Ag

HEFLINGER, CARL
409 Clara Street, Fairbanks
REDSTONE MINE, Yukon River-Livengood Dist.

HICKOK & ENGELHORN
Talkeetna
Clara Hickok, Forest Engelhorn
THUNDER CREEK PLACERS, Cook Inlet-Susitna-Yentna Dist, Au, Ag, Placers

HOLMES, WALTER L
May Creek via Cordova
REX CREEK MINE, Nizina dist, May Cr, via Cordova, open pit and placer, hydraulic, Au
No Prod

HYDER MINES, INC
904 4th Ave, Seattle 4, Wash
Pres: Donald H McNelly
VP: Edward R Wheat
1st VP: Mike Welsch
Sec: J W Boothe
Treas: Dr Robert L Camber
RIVERSIDE & CANTU MT MINES
Hyder, undergr, Pb, Ag, Au
WO_3 Cu, Zn
Mine Supt: Carl C Wikstrom
Geol-Met: Henry L Hill & Assoc.
Prod: 20 tons
50-TON FLOT MILL, Riverside
Mill Supt: Carl C Wikstrom
Under devel

IMPERIAL JADE CO.
Kotzebue
Own: G Joiner
PLACER, Jade Mtn, jade gemstone, undergr
Prod: 100 lbs daily

INDEPENDENCE MINE
c/o Harry Rice, Wasilla
LODE, Independence, Au, Ag

INMACHUK MNG CO.
Deering
INMACHUK PLACER, Deering
Own: Grant H Nelson
Floating Dredge
Prod: 2,000 yd per day

JAK MNG CO
1565 Crosson St., Fairbanks
Part: Joe Bayless
Ken Ringstad
PLACER, Yukon River, Bonnifield Dist, Au, Ag

JOHANSEN, ENGBRET
Chicken
PLACER, Yukon River-40 mi Dist, Ingle Cr, Au, Ag

JOHNSON, PETE
Manley Hot Spring
PLACER, Yukon River, Hot Springs Dist, Eureka-Baker Crs, Au, Ag

KENDRICK BAY MNG CO
Mines Park, Golden, Colo
Pres: Wallace Macgregor
VP: Ernest Jones
Horace A Sawyer, Jr
Sec: John P Fitz-Gibbon
Treas: J D Carnahan
KENDRICK BAY MINE, Prince of Wales Island, Alaska
open pit, U_3O_8
(see Colo)

KETTENDORF, JAMES
Box 657 -Hagamon Rd
Fairbanks
PLACER, Yukon River-Fairbanks Dist, Rosie Cr, Au, Ag

KODIAK EXPLORATION CO, INC
Box 484, Kodiak
Pres: George H Cornelius
VP: Emil Knudsen
Sec: Eunice Neseth
Treas: Robert von Scheele
Purch Agt: Henry Neseth
KECO PINK ROCK MINE, Kodiak, undergr, WO_3, Cu, Au, Ag
Gen Mgr: Henry Neseth
Asst Gen Mgr: Tom von Scheele
Geol: Charles H Scott
Mech Eng: Walter Achen
CLAIMS, undergr, open pit, placer, U_3O_8, WO_3, Au, Cu, Ni, Co, Ag
Under devel

LANGLOW, JENS
Central
PLACER, Yukon River-Circle Dist, Switch Cr, Au, Ag

LANNING, TONY
Hot Springs
PLACER, Yukon River-Hot Springs Dist., Thanksgiving Cr, Au, Ag

LEE BROS DREDGING CO
c/o Richard E. Lee
Box, 208, Nome
PLACER, Solomon Cr, Au, Ag

LINDQUIST, HJALMAR
Ophir
PLACER, Yukon River-Innoko Dist, Bedrock & Ester Creeks Au, Ag

LITTLE SQUAW MNG CO
309 Radio Central Bldg. Spokane 4, Wash
Pres: K W Jasper
VP: E Anderson
Sec: E K Barnes
MIKADO MINE, Chandalar, Alaska, undergr, Au
Gen Mgr: F Birch
Under devel

LONG CREEK MNG CO
Ruby
Gen Mgr: Hans Tilleson
PLACER at Long Cr, hydraulic dozer-dragline, Au, Ag

LOST CHICKEN HILL MINE
Chicken
Own: Jack L Grigsby
PLACER, Yukon River- 40 Mile Dist, Lost Chicken Hill, Au, Ag

LUCKY NELL MINE
Hollis
Own: J J Matuska
MINE, 7 mi W of Hollis, undergr, Au, Ag, Pb, Cu
Under devel
PUYALLUP MINE, 1 1/2 mi W of Hollis, undergr, Ag
Under devel
CASCADE MINE, 3 mi SW of Hollis, undergr, Ag
Under devel

LUCKY SEVEN MINE
Miller House
Op: Walter Roman
PLACER, Mastedon Cr, Circle dist, dozer-hydraulic, Au

LUCKY SYNDICATE
Box 615, Nome
Part: A L Schneider
S L Godfrey
PLACER, Seward Peninsula-Kougarok Dist, Kougarok River, Au, Ag

MARTIN, GLEN
Circle Hot Springs
PLACER, Yukon River-Circle Dist, Portage Cr, Au, Ag

MARVEL CREEK MNG CO
Aniak
Mgr: C J Ave
PLACER, Kuskokwim River Aniak Dist, Marvel Cr, Au, Ag

MILLER CREEK PLACER MINE
Own: G W Carr, Miller House
PLACER, Miller Cr, Au, Ag

MINALASKA, INC
Ophir
Warren E Magnuson
PLACER, Yukon River-Innoko Dist, Ganes Cr, Au, Ag

MINERAL BASIN MNG CORP
Dir: Arthur Moe, Box 9, Stewart, B C, Canada
LODE, Hyder, Ag, Cu, Pb

MISCOVICH BROTHERS (and) OTTER DREDGING CO
Flat
Part: George, John, Howard and Andrew Miscovich
PLACERS, Au

MONETA PORCUPINE MINES, LTD
320 Bay St, Toronto 1 Ontario, Canada
MINE, SE Alaska-Petersburg Dist, Endicott Arm, Cu
Under devel

MONTE CRISTO MNG CO INC
Gakona
Robert W. Beck
PLACER, Copper River-Chistochina Dist, Slate Cr, Au, Ag

NEW YORK-ALASKA GOLD DREDGING CORP
2503 Smith Tower, Seattle Wash
Pres & Man Dir: J K Crowdy
VP: Mark Mathewson
Purch Agt: L E Robbins
NEW YORK-ALASKA MINE, 60 mi NE of Bethel, placer, 3 dredges, dragline, Au
Res Mgr: Wm H Race
Elec Eng: Clarence Clark
(see Wash)

NORTHERN LIGHTS MNG CO
Ruby
Gen Mgr & Mech Eng: Michael Carroll
PLACER, Ruby Dist, Au

NUGGET MNG CO
Box 685, Nome
Own: Steve Pederson
MINE, Niukluk River, Council, placer, Au, Ag
opr a placer dredge in summer months

O'CARROLL, MICHAEL J
607 Clara St, Fairbanks
PLACER, Spruce Cr, Au, Ag

OTTER DREDGING CO
Flat
Own: George, John Howard and Andrew Miscovich
(see Miscovich Brothers, Alaska)

P & P MNG CO (also known as CHENA MNG CO)
c/o Bill Pintle, 216 3rd Ave, Fairbanks
PLACER, Dome Creek, Au, Ag

PEKOVICH, W S
Box 2642, Juneau
MINE, Port Snettisham, Juneau Dist, Fe
Under devel

PETERSON, MERRITT
Kiana
PLACER, Kiery Creek, Au, Ag

PILGRIM, EARL R & CO
Box 1896, Fairbanks
Own & Gen Mgr: Earl R Pilgrim
STAMPEDE MINE, Stampede 110 mi SW of Fairbanks, undergr, Sb
40-TON GRAV MILL
No Prod

PITTS PLACERS
Big Lake
Own-Op: E H Pitts
PITTS PLACERS, Big Lake, placer, hydraulic, Au, Ag

PRICE, STANTON
c/o Dean Goodwin
Box 1262, Juneau
PLACER, SE Alaska-Admiralty Dist. Spruce Cr-Windham Bay, Au, Ag

PRINCE CREEK MNG CO
Flat
Own: Harry Agoff
PLACER on Prince Cr, Iditarod Dist, Yukon Riv region hydraulic, Au

PRINGLE, AW
Hot Springs
PLACER, Yukon River-Hot Springs Dist. Rhode Island Cr Au, Ag

PURDY, FRED AND ARTHUR
Chicken
PLACER on Myers Fork, 40 mi Dist, Yukon Riv region, dozer-hydraulic, Au

PURKEYPILE CO
320 3rd St, Hamilton Acres Fairbanks
GRANDVIEW MINE, 17 mi SW of Mt Russel, open pit, Ag, Cu, Pb U_3O_8, WO_3, Zn
Gen Mgr: I W Purkeypile
Under devel
TOZIMORAN MINE, 30 mi W of Tanana
No Prod

RICE, HARRY
Wasilla
INDEPENDENCE MINE, Cook Inlet-Susitna-Willow Cr Dist, Lode, Au, Ag

RAMBAUD & HANKS
Chicken
PLACER, Yukon River, Fortymile Dist, Jack Wade Cr Au, Ag

RICHARDS, TIM
Candle
PLACER, Candle Cr, Au, Ag

ROBINSON, GEORGE F
Boundary
PLACER, Yukon River-Au, Ag

ROSANDER & REED
Ophir
Pres: T Rosander
PLACER, Yankee Cr, Innoko Dist, hydraulic-dozer-dragline, Au

RUBY MNG CO (formerly LONG CREEK MNG CO)
Ruby
PLACER, Ruby Cr, Au, Ag

SAVAGE, PAT
Ruby
PLACER, Long Cr

SHEEP CREEK MNG
Frank J. Miller & Sons
633 6th St, Fairbanks
PLACER, Sheep Cr, Au, Ag

SLATE CREEK MNG CO
Box 1564, Fairbanks
Own: E H DuRand
SLATE CREEK MINE, Slate Cr, Koyukuk Dist, placer, Au
Under devel

SQUAW CREEK MNG CO
c/o Jack Wilkey, Chicken
PLACER, Canyon Cr, Au, Ag

STANDBERG MINES, INC
926 4th Ave, Anchorage
PLACER, Colorado Cr, Innoko Dist, Indian Riv, Hughes Dist Eureka Cr, Hot Springs Dist, Au
LODE PROSPECT, Yentna Dist, Au
Under devel
NIXON FORK MINE, McGrath Dist

STOUT, C E
709 5th Ave, Fairbanks
MINE, Dahl Cr -Kobuk R, jade

SWANSON, CARL
Box 371, Nome
Part: Carl Swanson
SWEEPSTAKES PLACER, Seward Peninsula-Koyuk Dist

TALKEETNA MNG CO
Talkeetna
Mgr: Phillip Brandl
PLACER, Cook Inlet-Susitna-Yentna Dist, Dorman Claim on Cache Cr, Au, Ag

TOUSSAINT, E A
Fort Yukon
LODE, St. Mary's Cr, Au, Ag

TROTOCHAU, RAYMOND F
1808 8th Ave, Seattle 1, Wash
LODE, Kennecott, Cu, Ag

TWEET, N B & SONS
Teller
PLACER, Seward Peninsula Kougarok Dist
Kougarok River, Au, Ag

U S SMELTING, REFINING & MNG CO
Box 1170, Fairbanks
VP & Gen Mgr, Alaskan Opr: J D Crawford
FAIRBANKS DEPT, 6 gold dredges in Fairbanks area
Mgr: J C Boswell
Mine Supt: T A Loftus
Dredge Supt: W A La Fon
Cashier: J L Reed
Prod: 6,000,000 cu yds gravel

HOGATZA OPERATIONS, 1 gold dredge
Supt: Clay La Fon
Prod: 800,000 yds gravel
CHICKEN OPERATIONS:
Supt: Paul Clemmons
Prod: 700,000 yds gravel
NOME DEPT, 3 gold dredges
Mgr: C S Glavinovich
Cashier: Robert Baldwin
Prod: 2,000,000 cu yds gravel
(see Ariz, Mass, N Mex, Utah)

UOTILA, GUS
Ophir
PLACER, Ophir Cr, Au

WATKINS, ROBERT L
Box 521, Fairbanks
HOPE PLACER, Yukon River Fairbanks Dist, Faith Cr Au, Ag

WEINARD, O F & FRED
Candle
PLACER, Seward Peninsula Fairhaven Dist, Mud Cr Au, Ag

WEISNER TRADING CO
c/o Ira Weisner
Rampart
PLACER, Yukon River-Rampart Dist, Little Minook Cr, Au, Ag

WESTERN ALASKA MNG CO
Box 131, Spenard
Opr: R J Anderson
MINE, Hg
Under devel

WOLF CREEK MNG CO
Box 141, Fairbanks
Pres: Andrew Anderson
VP: Allan Osberg
Sec-Treas: Manie Olson
Asst VP: John Osberg
PLACER, Fish Cr, 30 mi N of Fairbanks, Au
Gen Mgr: Manie Olson

ZAISER, CLARENCE
Ruby
GREENSTONE MINING, Ruby, placer, Au

ZAISER, LEONARD
Medfra
PLACER, Kuskokwim River McGrath Dist, Birch Gulch Au, Ag

ALABAMA

ALABAMA FLAKE GRAPHITE CO
330 Comer Bldg.
Birmingham
Pres-Treas: W L Shumate Jr
VP: W L Moore, B J Carder
Sec: W C Dempsey
Asst Sec: Joseph Sims
Properties leased to INDUSTRIAL MINERALS CORP, 1129 Vermont Ave NW, Wash DC
Pres: Joseph O Wall
Sec: Marshall Stewart
Treas: Tony D Pittman
POCAHONTAS MINE, 4 1/2 mi W of Ashland, Ala, open pit, crucible graphite, mica
Under devel
500-TON FLOT MILL
No Prod

AMERICAN TALC CO
Chatsworth, Ga
Pres: M Woodward Glenn
VP: Francis T Glenn
Sec: J R Ferry
MINE, WINTERBORO, open pit, talc
Mine Supt: N R Davis
Prod: 100 tons
50-TON GRAVEL MILL, Alpine Mill Supt: T E Davis
Intermittent operation
(see Ga)

ARRINGTON MNG CO
Cedartown, Ga
WASH PLANT, Glenwood Brundidge, Pike County, Fe

DIXIE MINES, INC
Heflin
Pres& Treas: Ernest Kretschmar
VP & Purch Agt: Joe W Bailey
Sec: Robert D Abbott
Ofc Mgr: Neal Prichard
DIXIE MINE, Micaville, open pit, mice
Gen Mgr: Joe W Bailey
Adm Asst: Don Turner
Mine Frm: Glenn Gibson
Mine Eng: Donal Ziehl
Prod: 500 tons
GRINDING MILL
Mill Frm: Homer Queen

GENERAL GRAPHITE CO
Birmingham
Pres-Treas: W L Shumate Jr
VP: E J Watkins
S P McDonald Jr
Sec: J F Berry Baugh
Asst Sec: J Sims
Owner of Alabama Flake Graphite co

GLENWOOD MNG CO, INC
Glenwood
Pres & Gen Mgr: I D Gibson
VP & Asst Gen Mgr: C B Gibson
Sec-Treas: D F Jackson, Sr
GLENWOOD MINES, open pit Fe
Gen Supt: H A Patton
Mech Eng: M G Cornett
Prod: 1,000 tons
MILL
Mill Supt: W D McLeod
Asst Mill Supt: H H Patten

HARBISON-WALKER REFRACTORIES CO
307 Fifth Ave
Pittsburgh 22, Pa
Pres: E A Garber
Exec VP: A B Wilson
Sec: G F Cronmiller, Jr
Treas: L E Mock
Purch Agt: R P Snyder
EUFAULA MINE, Eufaula, bauxite, and 65 open pits and quarries in the U S
Prod: 2,000 tons
30 refractories mfg plants throughout the U S
(see Pa)

REPUBLIC STEEL CORP
PO Box 2594, Birmingham
EDWARDS MINE, undergr, Fe
Gen Mgr: B H McCrackin
Mech Eng: A E Higgenbotham
Elec Eng: T A McDougal
Ch Eng: R B Watt
Mine Supt: B C Jones
Mine Frm: Aaron Benson
Mine Eng: T P Castellitto
Prod: 3,500 tons
SPAULDING MINE, undergr open pit, Fe
Mine Supt: J G Blackwell
Mine Frm: J E Jackson
No Prod
(see Mich, Minn, NY, Ohio)

SHOOK & FLETCHER SUPPLY CO
1814 1st Ave N, Birmingham
Pres: P G Shook
VP: A M Shook, III
Sec-Cont: H O Thomas, Jr
Purch Eng: L M Quick
BLACKBURN & WARNER MINES, Russellville, surface, Fe
Gen Mgr: E H Craddock
ADKINS MINE, Woodstock, surface, Fe
Gen Mgr: H C Gunter
Prod: 2,500 tons
TAIT'S GAP MINE, surface, Fe
(see Mo)

SMITH MNG CO, THE
Luverne
SMITH BROWN ORE MINE, Fe

SOUTHEASTERN COAL & IRON CO
Ridgley Apts, Birmingham
Pres & Gen Mgr: Temple Tutwiler, III
DUDLEY MINE, Tuscaloosa Co, Fe

US PIPE & FOUNDRY CO
3300 1st Ave N, Birmingham
Chm of Board: C S Lawson
Pres: R E Garrett
VP, Sec & Treas: J W Brennan
VP: D E Watkins, R N Voigt
Purch Agt: H E Cross
Gen Supt Mines: J W Nicol
Geol: Jack F Morris
Mng Eng: George Jones
Prep Supt: R H Stacy
Elec Eng: Frank Brush
Safety Eng: J A Downey
RUSSELLVILLE MINE, 5 mi SW of Russellville, open pit, Fe
Supt: S A Britton
Frm: H McAllister
HEAVY MEDIA MILL
Prod: 2,000 tons of (brown) ore
BLAST FURNACE #5, Birmingham
Supt: W Nielsen
RUFFNER #2 MINE, Irondale, 7 mi E of Birmingham, undergr, Fe (red) ore
No Prod

U S STEEL CORP
TENNESSEE COAL & IRON DIV
PO Box 599, Fairfield
Pres: A V Wiebel
Exec VP: JW Kinnear Jr
VP-Oper: W E Crouch Jr
Mgr, Raw Mat: E P Reed
Ch Eng, Raw Mat: W S Springer
Dir of Purchases: L C Teague
IRON ORE MINES & BENEFICIATION PLANT, 6 undergr mines near Bessemer
Cap: 4,861,600 net tons crude iron ore yrly
Gen Supt, ore mines & Quarry: A W Beck Jr
Supt, #7, 8, 9 & 10 Mines: P J Zukow
Supt, #11, & 14 Mines & Dolonah Quarry: R W McEniry
Supt Beneficiation Plant: G W Neal
(see Calif, Minn, Pa, Tenn, Utah, Wyo)

WILSON, D M BAUXITE CO
Eufaula
ORLEE MINE

WILSON, R E, MNG CO
PO Box 9, Eufaula
Part: R E Wilson
Anne C Wilson
Sec: Linda W Braswell
EUFAULA MINES, open pit, bauxite
Under devel
80-TON MILL, Eufaula
Plant Frm: John Paul Taylor

WOODWARD IRON CO
Woodward
Chmn of Bd: John E Urquhart
Pres: W R Bond
VP: John Hager, W J Shaw, Jr
VP-Sec: D T Turnbull
Treas: W R Cottrell, Jr
Met: F U Leonard
Safe Eng: Stanley Mooney
Purch Agt: H K Stokes
FYNE MINE, 8 mi S of Bessemer, undergr, Fe
Prod: 5,000 tons
Mine Supt: W. T. Davis
Asst Mine Supt: W H Thompson
Mine Eng: S E Sullivan
BLAST FURNACE, Woodward
Gen Supt: J W Casey
Asst Supt: C Y Huff
Prod: 772,632 net tons yrly

ARIZONA

A & B MNG CO
c/o Tom Baisley, Box 95, Moab, Utah
MITTEN #2 MINE, Navajo Co U_3O_8
(see Utah)

ALBA MNG CORP
Sanders
MINE, Apache City, surface bentonite
Mgr: Spencer Balcomb, Jr

ALTUDA MINES, INC
PO Box 1743, Yuma
Pres: Doyle C Gills
VP: Carrol Reed
Sec-Treas & Gen Mgr: Harry E Hamilton
ALTUDA MINE, 25 mi SE of Gila Bend, undergr, open pit, Au, Ag, silica flux
No Prod

AMERICAN ARIZONA METALS CO

Mgr: Mr. Harriett
EMPIRE MINE, Yuma County, Au, Ag, Cu

AMERICAN SMELTING AND REFINING CO
WESTERN MNG DEPT SW DIV
613 Valley National Bldg, Tucson
Mgr: T A Snedden
Asst Mgr: A C Hall
Ch Geol: Kenyon E Richard
HAYDEN PLANT, Hayden, 1200-ton smelt and conv, Cu
Supt: E E Groff
SW ORE PURCH OFFICE
910 Valley Nat'l Bldg, Tucson
Mgr: Reed F Welch
SILVER BELL UNIT, Silver Bell, surface, Cu
Gen Supt: D R Jameson
Prod: 7,500 tons
FLOT MILL, Silver Bell
MISSION UNIT, Sahaurita
Gen Supt: R B Meen
Under devel
(see Calif, Colo, Idaho, Ill, Md, Mont, Nebr, N J, N Mex, N Y, Tex, Utah, Wash)

AMERICAN ZINC, LEAD & SMELTING CO
1515 Paul Brown Bldg
St Louis, Mo
HILLTOP MINE, Portal, undergr, Pb,Zn, Ag, Cu
No Prod
(see Ill, Mo, N M, Ohio, Okla, Tenn, Tex, Utah, Wash, Wisc)

AMPET CORP
523 Colorado Bldg, Denver, Colo
Pres: R A Gus Davis
VP: Robert J Paul
Sec-Treas: Alfred O Brehmer
MINE
No Prod
(see Colo, Utah)

APACHE MNG CO
Box 283, St Johns
WARHOOP MINE, Apache Co, U_3O_8

ARICANA-SENATOR MNG CO
119 Adelaide St, W, Suite 300
Toronto, Canada
Pres: C A Wuest
SENATOR MINE, 14 mi E of Prescott, Yavapai Co, undergr
Au, Ag, Pb, Cu, Zn
Under devel
MILL, under const

ARIZONA CONTINENTAL URANIUM
205 E Camelback Rd
Phoenix
HOPE MINE, Gila Co, U_3O_8

ARIZONA DIATOMES, INC
1010 E Osborn Road, Phoenix
Pres: A U Partipilo MD
VP & Sec: Paul E Cook
Treas: W O Wood
WHITE CLIFF MINE, 8 mi SE of Mammoth, open pit, diatomaceous silica
Gen Mgr: Paul E Cook
Mine Supt: E J Nicholson
Under devel
AIR SEPARATION MILL, at mine

ARIZONA GYPSUM CORP
PO Box 6192, 2255 S 19th Ave
Phoenix
Pres: John F Fisher
VP, Mine Supt: James M Champie Sr
Sec: William J Kessler
Treas: John M Haselett
ARIZONA GYPSUM MINE, PO Box 24, Winkelman, open pit gypsum
MINE, Camp Verde, open pit, gypsum (Former property of Verde Gypsum Co)
MILL, crush & screen

ARIZONA MICHIGAN MNG CO, INC
Prescott
Mgr: L W Rayner
SILVER CROWN MINE & MILL, Yavapai Co

ARIZONA MINE, THE
Box 67, Humboldt
Gen Mgr: Verdin Alexander
ARIZONA MINE, THE, 2 1/2 mi W of Humboldt, Au, Ag, Pb, Zn
No Prod

ARIZONA MOHAVE MNG CO
Box 388, Kingman
Own: Earl H Duke
MEXICAN MINE, Mohave Co, Au, Ag
No Prod

ASBESTOS PEAK MINE
PO Box 881, Globe
ASBESTOS PEAK MINE
Gen Mgr: Rex C Town (Assessment work only)

ASSOCIATED MINERALS, INC
30 Pima Plaza, Scottsdale
Pres: C Neil Vogel
VP: James Farmer
Sec: Robert Brown
Treas: W B Pratt
MINE, Flagstaff, placer, pumice
Under devel

ATLAS COPPER, INC
PO Box 642, Prescott
Pres: Ed C Mahnken
VP: Grady Witcher
Sec: Theresa Mahnken
Treas: Harold K Schultz
Dir: Gary Rehfeld, Chester Dean
ATLAS MINE, Humboldt, open pit, Cu, Ag, Au
Gen Mgr: Ed C Mahnken
Mine Frm: Grady Witcher
Prod: 100 tons
100-TON FLOTATION MILL, Humboldt

B S & K MNG CO
655 1st Natl Bank Bldg
411 N Central Avenue, Phoenix
Pres & Gen Mgr: A M Kalaf
VP & Sec-Treas: George Kalaf
ATLAS MINE, Box 18, Silverbell 19 mi SW of Red Rock, undergr, Cu, Zn
Mine Frm: Walter Whitlow
125-TON FLOT MILL, 19 mi SW of Red Rock
Mill Frm: Milton Reeves

BACON, JOHN
GRIMES, GORDON
BRUNSON, WM
Tonto Basin
TURNBULL MINE, Tonto Basin, Sunflower Dist, N Maricopa Co, undergr, cinnabar
Mine Supt: John Bacon
Asst Mine Supt: Wm Brunson
RETURT
Prod: 4.3 tons in 1960

BAGDAD COPPER CORP
Box 245, Bagdad
Pres: David L Lincoln
Exec VP: Geo W Colville
Sec: R H Jamieson
Purch Agt: Edgar Kellis
Controller: Maurice Thon
BAGDAD MINE, Bagdad, open pit, Cu, Mo, Ag
Gen Mgr: G W Colville
Asst Gen Mgr: R C Bogart
Mech Eng: C W Myers
Geol: R J Bonnis
Leach Plant Supt: E S Howell
Elec Eng: W D Deacon
Safety Eng: H W Loe
Mine Frm: D S Pike, Van Irwin
Mine Supt: E LeRoy Jones
Prod: 5,000 tons
5,000-TON COPPER FLOT MILL, Bagdad
Mill Supt: Gaylen W Guest
Mill Frm: D Vantilborg
Assayer: D T Holmes

BALESTEROS, RICHARD
Ajo
SAN ANTONIO MINE, Pima Co, Silica

BALINA, P
Kayenta
NOSCHOY MINE, Navajo Co, U_3O_8, V_2O_5

BANNER MNG CO
PO Box 5605, Tucson
Pres: L L Travis
VP & Gen Mgr: A B Bowman
VP: John M Wallace
Sec-Treas: James E Hogle
Ch Acct & Asst Sec: F C Prince
Purch Agt: E C Bowman
DAISY, MINERAL HILL & PALO VERDE MINES, Tucson, undergr
Cu, Ag
Gen Mine Supt: B W Venable
Mine Supt: Gus Holzworth
Geol: F D MacKenzie
Mine Surveyor: W Phillips
Chem: R G Miranda
Chem Eng: E C Brace
Ch Elec: H Hodgers
Master Mech: E E Bray
TWIN BUTTES MINE, Tucson
No Prod
1,000-TON FLOT MILL, Mineral Hill Mine
Supt: F E Horton
(see N Mex)

BARTON, HUGH & RUTH
PO Box 323, Holbrook
MINE, RUTH CLAIMS, U_3O_8

BENNETT, R W
Mayer
BLUE BELL MINE, Yavapai Co

BENSON MNG & LEASING
4233 E North St, Tucson
Own: Robert R Benson
(see Colo)

BIG HOLE MNG CO
(Partnership)
Box 125, Jerome
Pres: Mark Gemmill
Gen Mgr: R H Gemmill
UNITED VERDE MINE, Yavapai Co, open pit, Cu
Prod: 20 tons

BLAKEMORE, PAGE P
c/o Cameron Mng Co, Cameron
ELWOOD CANYON #2, JACK DANIELS #1, LIBA #17, MINES Cameron, undergr, open pit
Prod: 10 tons
Mine Supt: Rollin Dunlap

BLEDSOE, WM & MARY
Gen Del, Wagoner
PAY DIRT MINE, Yavapai Co, Au, Ag, Cu, Pb, Zn

WALTER BOPP MNG CO
43 S 6th Ave, Tucson
Gen Supt: L Jarnagin
SILVER RAY, 14 mi W Amado undergr, Ag
No Prod

BOULDER MNG CO
Box 5, Patagonia
COMPADRE MINE, Santa Cruz Co, Au, Ag, Cu, Pb, Zn

BUCKEYE MICA CO
Box 416, Buckeye
Pres & Gen Mgr: H G Smith Sr
VP: H G Smith Jr
Sec: W Peakocke
BUCKEYE GROUP, 3 1/2 mi S of Buckeye, undergr, Mica (muscovite), Sericite, Be, Feldespar
Supt: A Duncan
Asst Supt: C Murphy
Frm: C V Hill
Prod: 100 tons
LUCKY CHANCE 1-2-3, 5 mi W of Quartsite, Sericite
Prod: 25 tons
Under devel
100-TON DRY & WET GRINDING MILL
Supt: J G Smith Jr
Frm: Wayne Watts

BUNDY, C M
Mt Trumbull (via St George, Utah)
RED WING MINE, open pit, Cu, U_3O_8
No Prod

CALARI MNG CO
3939 Linden Ave, Long Beach 7, Calif
Pres: L F Albrecht
Sec-Treas: C M Smith, 5863 Olive Ave, Long Beach 5, Calif
RUTH MINE, 6 mi S of Prescott, undergr, Pb, Zn, Ag, Cu, Au
No Prod
(see Calif)

CAMERON MNG CO
(Page P Blakemore)
Cameron
E CANYON, JUAN HORSE, YAZZIE 312, YAZZIE 101, DENETSO 1, HUSKON 1-17 MINES, Cameron Dist, Coconino Co, undergr, open pit, U_3O_8
Gen Mgr: Page P Blakemore
Geol: Louis W Cramer
Mine Frm: Ward Stechile
Prod: 30-50 tons

CENTENNIAL DEVELOPMENT CO
Box 5671, Tucson
Pres: H B Spencer
(see Utah)

CENTURY MOLYBDENUM COPPER CO
35 N Matlock St, Mesa
Pres: Arnold H Johnson
Sec-Treas: Helen D Johnson
Purch Agt: A H Johnson
RARE METALS MOLY, BLACK COPPER MINES, 9 mi S of Ray undergr, Mo, Cu, Au, Ag
Mine Supt & Gen Mgr: A H Johnson
No Prod

CHESSHER & COMPANY
c/o Dave Pelan, 301 Uranium Center Bldg, Grand Junction Colo
YAZZIE #102 MINE, Coconino Co, U_3O_8

CHILITO MINE GROUP
Box 565, Hayden
Own: B C Velasco
Treas: Consuelo P Velasco
CHILITO COPPER MINE, Gila Co, open pit, Cu, silica
Prod: 50 tons
(leased to Gordon Wainwright)
(see New Apex Gold Mines, Ariz)

CLANI, THOMAS
Be Clah Bito Trading Post, Shiprock, New Mexico
BLACK ROCK POINT #3 MINE, Apache Co, U_3O_8
No Prod

CLEOPATRA MNG CO
PO Box 257, Congress
Pres: Robert Burns
Treas: James Tearney
CLEOPATRA MINE, Yavapai Co, open pit, Cu, Au
Gen Mgr: Robert Burns
Under devel
ST JUDE MINE, Yavapai Co, Under devel

CLIMAX URANIUM CO (SUBSID AMERICAN METAL CLIMAX INC)
PO Box 989, Grand Junction, Colo
VP& Gen Mgr: A M Mastrovich
URANIUM EXPLOR & PROD, Navajo Indian Reservation
(see Colo, NY, Utah)

CONGDON & CAREY
1st Natl Bank Bldg, Denver 2, Colo
Gen Part: T E Congdon, W J Carey
Geol: D W Fieldman, H E Haynes
JOHN TODEA MINE, Coconino Co, undergr, U_3O_8
Gen Mgr: Harry E Haynes
Asst Gen Mgr: Dolf W Fieldman
(see Colo)

CONNER, DR KENT
926 E McDowell Rd, Phoenix
RAY SILVER LEAD MINE, Pinal Co, Au, Ag, Cu, Pb, Zn

COPPER HILL MINE
Box 369, Globe
Lessee: E M Moores, Jr.
MINE, open pit, siliceous copper ores
Prod: 50 tons daily

CORONADO COPPER & ZINC CO
523 W 6th St, Los Angeles 14, Calif
Pres: K Lieber
VP: H T Mudd, P W Allen
VP & Sec-Treas: H S Nye
JOHNSON CAMP UNIT, Cochise Co, undergr, Cu, Zn
Prod: 200 tons daily
(Leased by MacFarland & Hullinger)
(see Calif)

COVERED WELLS COPPER CO
4355 E Elmwood, Tucson
Pres: Milton F Graf
ST PAT COPPER MINE, Pima Co, Cu
No Prod

CYPRUS MINES CORP
523 W 6th St, Los Angeles 14, Calif
OLD DICK MINE, Box 549, Bagdad, undergr, Cu, Zn
Res Mgr: Curtis Sundeen
Mine Supt: J Sierakoski
Geol Eng: R Skiles
Mast Mech: H Sharff
Ch Clerk: W Nelson
Prod: 240 tons
240-TON FLOT MILL, Bagdad
Mill Supt: A Hunt
Met: L Yundt
Assay: P Diemer
(see Calif)

DIAMOND URANIUM CORP
510 Felt Bldg, Salt Lake City, Utah
MINE, L LITTLEMAN CLAIMS, Coconino Co, U_3O_8

DOMINO MNG CO
1721 Sunset Dr, Flagstaff
Pres: T J Ellis
VP: C G Ware
AMENDED HUSKAN #8, Little Colo Mng Dist, Cameron Area, open pit, U_3O_8
Gen Mgr: T J Ellis
Prod: 4 tons

DOYLE MINE & DOYLE BLACK BAND MINE
Wenden
Own: Harrison Doyle
R N Doyle
A T Morgan
DOYLE MINE, Wenden, undergr, open pit, Mn
No Prod
200-TON FLOTATION MILL, Wenden
No Prod

DUVAL SULPHUR & POTASH CO
1906 First City Natl Bank Bldg, Houston 2, Texas
Pres: W P Morris
VP: G E Atwood
VP & Treas: Eugene German
Sec: V J Thornhill
Adm Asst: B G Messer
COPPER DIVISION-
ESPERANZA MINE, Box 11277, Tucson 2, open pit, Cu, Mo
Res Mgr: G E Atwood
Asst Res Mgr: C HCurtis
Geol: D M Clippinger
Metal: R Livingston
Mine Eng: Tom Jancic
Mech Supt: H A London
Prod: 11,500 tons
(mined by Isbell Constr Co)
Mine Supt: J H Shahan
10,000-TON FLOT MILL, at mine
Mill Supt: I B Phillips
(see N Mex, Texas)

E C DEVELOPMENT CO, INC
c/o W W Barrett, Kingman
Pres: W W Barrett
Sec-Treas: M H Barrett
Land Supt: C F Eggers
LOST BASIN MINE, Mojave Co, placer, Au, rare earths
Gen Mgr: W W Barrett
Asst Gen Mgr: C F Eggers
Under devel

FLINTKOTE CO, THE US LIME PRODUCTS DIV
2244 Beverly Blvd
Los Angeles, Calif
Pres: I J Harvey, Jr
VP & Gen Mgr: Kennedy Ellsworth
Asst Gen Mgr: Hardin Stephens
Gen Supt, Nev, Ariz: J C MacDonald
Prod Mgr: L N Gindell
Res Mgr, Tuolumne Co: Wm McCandish
NELSON QUARRY & PLANT, PO Box 199, Peach Springs, loc at Nelson, open pit, lime
Plant Supt: James Curless
MILL, Nelson
(see Calif, Nev, Tex)

FOLEY BROTHERS, INC
1111 Desert Bldg,
Salt Lake City, Utah
YAZZIE MINE, Coconino Co, U_3O_8

FREEMAN, GEORGE A
Casa Grande
ORIZABA MINE, Maricopa Co, Au, Ag, Cu, Pb, Zn

FRONEK, GLEN J
Wickenburg

MINE, Maricopa Co, Au, Ag, Cu, Pb, Zn

GAMES MNG CO
Payson
Mgr: B Thompson
DELEWARE MINE, Gila Co

GIBRALTAR MINERALS CO
PO Box 35087, Dallas 35, Texas
Pres: Harold Hinn
VP: Robert Hinn
Treas: Vincent Tudor
BOOT JACK MINE, PO Box 38, Kayenta, undergr, U_3O_8
Prod: 100 tons

GLENDEL MNG CO
1218 S 19th Ave, Phoenix
Pres: D W Jaquays
CONGRESS MINE, Yavapai Co, Au, Ag, Cu, Pb, Zn

GOETZ, CHAS E
Box 2228, Phoenix
79 MINE, Gila Co, Au, Ag, Cu, Pb, Zn

GOLDEN EAGLE MNG CO
Phoenix
Mgr: R Johnson
HARQUA HALA MINE, Yuma Co

GOLDEN GATE MNG CO
PO Box 1118, Wickenburg
Pres & Purch Agt: E von Glahn
Sec: Frances A von Glahn

GOLLADAY, DWIGHT H
Prescott
HOLIDAY CLAIM, Au, Ag, Cu, Pb, Zn

GRIMES & BRUNSON
Tonto Basin
Pres: Gordon K Grimes
VP: Wm Brunson
Sec: Clara W Grimes
GOLD CREEK MERCURY MINE 25 mi S of Payson on Beeline Hwy, undergr, Hg
No Prod
MILL, Cane Spring, Gila Co, 1/4 mi N of Beeline Hwy
Mill Supt: Gordon K Grimes
Asst Mill Supt: Wm Brunson
Cap: 35 tons cinnabar ore daily
Custom smelting for the Turnbull mines

GUESS, S C
3141 E 28th St, Tucson
NORTH STAR MINE, Final Co, Au, Ag, Cu, Pb, Zn

GUINN & BURD
Mesa
REWARD CLAIMS, Au, Ag, Cu, Pb, Zn

W B HALL
Cortez, Colorado
NAKAI CHEE BEGAY MINE, Apache Co, U_3O_8

HARBORLITE, INC
PO Box 458, Escondido, Calif
MARY T & SANDY No 2 MINES & MILL, Br 503, Superior
Supt: Marion Mognette

HARGROVE, J W
Kayenta
BIG CHIEF & WALTER CHIEF MINE, Navajo Co, U_3O_8, V_2O_5

HARVEY HATCHER MNG CO
Mammoth
HARVEY HATCHER MINE, Au Ag, Cu, Pb, Zn

HAVERFIELD, J C
3138 E McDowell Rd, Phoenix
LONG VIEW & COPPER STAR MINES, Maricopa Co, Au, Ag, Pb, Zn, Cu

HEATH, W D
Box 35, Payson
LUCKY BOY MINE, Gila Co, Au, Ag, Cu, Pb, Zn

HI JOLLY MINES CORP
Univ Sta Box 4335, Tucson
Pres: W E Iseman
Treas: Herbert H Moorison
Sec: Thomas H Clister

RICO MINE,
Gen Mgr: Frank Kesler
Geol & Met: Ben H Martin
Under devel

HILTON, E P
Box 1308, Tucson
STATE OF MAINE & LONE MTN MINES, undergr, Pb, Ag, Au
No Prod

HOLIDAY MNG CO
Box 457, Pima
SEIN FEIN MINE, Graham Co, Au, Ag, Cu, Pb, Zn

HOOPES & CO
Globe
Mgr: K L Hoopes
MINE, MILL in Gila Co, limestone, lime

HOWELL, SHEPPARD & BOSLEY
Box 961, Flagstaff
MURPHY #13 MINE, Coconino Co, U_3O_8
No Prod

INDUSTRIAL URANIUM CO
273 So Main St, Salt Lake City, Utah
Pres: Robt M Schubach
VP: Jas D Moyle
Sec-Treas: W MBurton
Mgr: Bill Doolin
NATIONAL MINE, Maricopa Co, Hg
MOONLIGHT, & WALTER CHIEF, SUNLIGHT, STAR-LIGHT MINES, Monument Valley, U_3O_8, V_2O_5, Cu undergr, open pit
Prod: 275 tons

INSPIRATION CONSOLIDATED COPPER CO
25 Broadway, N Y 4, N Y
Pres: H M Jacob
VP: H Carroll Weed
Sec-Treas: E F Wendt
Asst Treas: R F Morison
Dir of Purch: A B Harris
INSPIRATION MINE, Inspiration, open pit, Cu
Asst Gen Mgr & Asst Sec-Treas: C G Stunz
Plant Supt: C B Kettering
Gen Supt: A H Neal
Geol: E F Reed
Mech Eng: H M Propper
Elec Eng: M Smith
Aud: J T Paul
Purch Agt: K W Whiteaker
Power Plant Supt: T E Tisard
Mine Supt: J R Watts
Asst Mine Supt: T E Bilson
Gen Plt Frm: T M Anderson
Chief Mine Eng: J L Carne
Prod: 16, 000 tons
FERRIC SULPHATE LEACHING PLANT & CONCENTRATOR, Inspiration
Leaching Plant Supt: W. D Shrader
Chief Res Eng: A J Turk
Acid Plant Frm: J C Davies
Conc Supt: K L Power
Conc Frm: A L Welch
Cap: 16, 000 tons
CHRISTMAS MINE, Christmas undergr, Cu
Gen Supt: BB Whitney
Supt: N G Thomson
Gen Mine Frm: M R Flaiz
Geol: J T Eastlick
SMELTER, Inspiration
Supt: H Allen, Jr
Asst Supt: R R Hyde
Cap: 80, 000 tons per year

INTERMOUNTAIN EXPLORATION CO
PO Box 398, St George, Utah
Pres: Richard V Wyman
Sec: Anne F Wyman
SQUAW PEAK MINE, Camp Verde, undergr, Cu, Mo
Gen Supt & Met: Jack K Howell
Under devel

INTERNATIONAL MINERALS & CHEM CORP CONS FELDSPAR DEPT
Old Orchard Rd, Skokie, Ill
VP: Norman J Dunbeck
Gen Mgr: James E Castle
Mgr: E W Koenig
Prod Mgr: Phil Blaxovic Jr
Sales Mgr: W K Burris
FELDSPAR MINE, Box 229, Kingman, surface
Supt: J W Allen

150-TON MILL, Kingman, fine grinding
Supt: J W Allen
(see Fla, Ill, Maine, Miss, N C, N Mex, S D, Tenn, Va, Wyo)

ISBELL CONSTRUCTION CO-MINING DIVISION
PO Box 2351, 3113 S Virginia St, Reno, Nevada
DUVAL SULPHUR & POTASH CO'S ESPERANZA MINE, near Tucson
Supt: Jim Shahan
Asst Supt: Charles Boise
Mech Frm: Bert Clark
(see Nevada, Utah, Wash)

JACKSON, LEO D
Box 115, Lea, Utah
NORTH SLOPE MINE, Apache Co, U_3O_8
No Prod

JACKSON, WILLIAM E
Box 24, Payson
GOLD HILL MINES, Gila Co, Cu
RED ANT MINE, Gila Co, Au, Ag
Under devel
5-TON FLOTATION, GRAVITY & AMALGAMATION MILL, at mine

JACOBS LAKE MNG CO
Box 132, Mifflin, Wisc
PETOSKEY GROUP, Coconino Co, Cu
No Prod

JAQUAYS MNG CORP
1219 S 19th Ave, Phoenix
Pres & Gen Mgr: D W Jaquays
VP: G A Jaquays
Asst Gen Mgr: Alvin Gerhardt
Gen Supt: Leroy Wood
ELDORADO & VICTORY MINES Box 328, Globe, 47 mi N of Globe, undergr, asbestos
Gen Mgr: Alvin Gerhardt
Asst Gen Mgr: Leroy Wood
Gen Supt: Everett Coetle
Prod: 150 tons rock, 15 tons asbestos mill ore
40-TON GRAV MILL, Globe
Mill Supt: Ray H Davis

JEZEBEL MINE
PO Box 51, Connell, Wash
Pres: J E Thornton
MINE, Sells Star Route, Tucson, mine loc, Fresnal Mng Dist, 15 mi E of Sells, undergr, scheelite
Gen Mgr: J E Thornton
Gen Supt: E A Thornton
Geol: M E Thornton
20-TON GRAV MILL, Tucson
No Prod
(see Wash)

K B R MNG & DEVEL CORP, INC
Box 216, Yarnell
Pres & Purch Agt: Jerold P Kolar
VP: Claude Brittain
Sec: Philomine Brittain
Treas: E Kolar
STAR OF ARIZONA, ELSIE'S JACK POT #1 & #2 MINES, Kolar Group, undergr, Au, Ag, Cu, Pb
Gen Mgr: J P Kolar
No Prod

KACHINA URANIUM INC
6245 N 16th St, Phoenix
KACHINA MINE, Coconino Co, U_3O_8
MONTEZUMA MINE, Coconino Co, U_3O_8
No Prod

KENNECOTT COPPER CORP, RAY MINES DIV
Hayden
Gen Mgr: A P Morris
Asst Gen Mgr: R B Young
Compt: C R Knous
Purch Agt: E G Stebbins
Adm Asst: C L Hoyt
Dir Ind Rel: F A Yagmin
Safety Dir: J T Mortimer
Ind Eng: J M Hood
Dir Quality Constr: L E Mulholland
Gen Supts:
J C Van De Water - Mine
F G Woodruff - Reduction
Mech Supts:
A L Dickerson - Mine
J E Stocker - Reduction
Met: H D Cox
Mine Supt: R W Ballmer
Mine Frm: R F Winkle
Mine Eng: H W Bishop
Geol: R A Metz
RAY MINES, open pit, Cu, Ag
Prod: 22, 500 tons
22, 500-TON FLOTATION MILL, Hayden
Mine Supt: A T Shukas
REDUCTION PLANT, Hayden
Plant Eng: J A Cooper
REVERBERATORY SMELTER, Hayden
Smelter Supt. W H Winn
Metal output: 132, 000, 000 lbs of copper yearly
(see Nev, N Mex, N Y, Utah)

KENNECOTT COPPER CORP, SAFFORD PROJECT
Box 30, R 1, Safford
LONESTAR MINE, Safford, under devel
Mng Engr: Sam K Smyth
Geol: Annan Cook
(see Nev, N Y, N Mex, Utah)

KERN COUNTY LAND CO
2624 N 1st Ave, Tucson
Mgr, Minerals Dept: Wm T Griswold
Ch Minerals Geol: Wayne K Wallace
(see Calif, Idaho, Utah)

KERR- McGEE OIL INDUST, INC
NAVAJO URANIUM DIV
Box 608, Shiprock, N Mex
COVE MINE, Cove, undergr U_3O_8, V_2O_5
Gen Mgr: C L Wise
Geol: Billy Stevens
Mine Supt: Jack Landon
Mine Frm: Vernon Willden
Prod: 250 tons
MESA GRP AND SIMPSON #181 MINES, Apache Co, U_3O_8
(see Colo, N Mex, Okla, Wyo)

KING & CRAWFORD
Box 85, Vicksburg
Part: Clarence King
YUMA COPPER MINE, Yuma Co, Cu
Under devel

KING MIDAS MINES, INC
PO Box 419, Oatman
Pres: F Lyle Gilkey
VP-Gen Mgr: James H McCarthy
Sec-Treas: Frances H Hittson
ALTA & IDA MINES, Oatman Dist, Mohave Co, undergr, Au Ag
Mine Supt: F L Gilkey
Under devel

KNOX-ARIZONA COPPER MNG CORP
8967 Ladue Rd, St Louis 24 Mo
Pres: Wm A Knox
VP: Tom Keyes
Sec-Treas: Wm A Knox
COPPER MT MINE, Ajo
Under devel

KYLE ASBESTOS MINES OF ARIZ
Box 302, Globe
SLOAN CREEK, LUCKYSTRIKE MINES
Op: Roger Q Kyle

LAW, RALPH
Aguila
BLACK BART NO 1, LUCKY NO 1 MINES, Mn
No Prod

LAXTON & EDWARDS
Wickenburg
LITTLE DANDY MINE, Maricopa Co, Au, Ag, Cu, Pb, Zn

LE TOURNEAU ASBESTOS CORP
PO Box 812, Globe
Pres: Samuel Patterman
FOURTH OF JULY & BORE TREE SADDLE MINES, asbestos,
Gen Mgr: Wayne Hamman
Under devel -assessment work only
50-TON MILL, Highway 70 mi E of Globe
Mill Supt: L E Town

LITTLE HILL MINES
Box 338, Oracle
Gen Mgr: Dave McGee

GOLD HILL MINE, Pinal Co, undergr & open pit, Au, Ag, Cu, Pb, Zn
Under devel
Prod: 50 tons

LOMA GRANDE MNG CO
Parker
Mgr: O L Murray
MINE, Yuma Co

LUCKY STOP MNG CO
Young Rt, Globe
Part: Johnnie Brunson
William Brunson
Ed Conway
Hugh Nichols
LUCKY STOP MINE, Gila Co, undergr, U_3O_8
Mgr & Mine Supt: Johnnie Brunson
No Prod

LUCKY SWEDE MINE CLAIM
Box 2231, Warren
LUCKY SWEDE MINE CLAIM, U_3O_8
No Prod

P H LUND ENGINEERING CO
3411 N 14th Place, Phoenix
Pres: Guy J Stumpff
VP: Emmet R Feighner
Sec-Treas: P H Lund
LUCKY HORSE SHOE GROUP Gila Co, open pit
Gen Mgr: Guy J Stumpff
Mine Eng & Geol: P H Lund

LYDIA MNG CORP
Miami
Mgr: A Meyers
LYDIA MINE, Gila Co

JAMES W LYNCH
General Delivery, Cameron
JACK HUSKON #3 MINE, Coconino Co, U_3O_8

MAC DONALD CONSTRUCTION CO
4344 E Indian School Rd, Phoenix
GOLDEN SANDS PROJECT, Morristown, placer, Au
Gen Mgr: Walter A Martin
Gen Supt: A J Henry
Prod: 800 tons (bank run)
DRY PROCESS MILL, Morristown
Mill Supt: A J Henry

MAGMA COPPER CO
Box 37, Superior
Pres & Gen Mgr: W P Goss
Asst Gen Mgr: J F Buchanan
VP & Sec: Roy Bonebrake
Treas: W P Schmid
Purch Agt: Ray Medlock
MAGMA MINE, Superior, undergr, Cu, Au, Ag
Gen Mgr: Darrell Garner
Gen Supt: G L Augustadt
Geol: R N Webster
Mine Supt: Cecil Tomerlirn
Asst Mine Supt: H S Steel
Mine Eng: B Van Voorhis
Prod: 1, 500 tons
1, 500-TON FLOT MILL, Superior
Supt: Halder Rex
Frm: M C Cooksley
Assay: Martin Harris
REVERB SMELTER, Superior
Supt: E J Caldwell
Asst Supt: C L Soule
Prod: 48, 000, 000 lbs yrly

H F MAGNUSON & CO
c/o Inar Norgaard, Box 660, Kellogg, Idaho
OPERATION 10, 17 MINES, Navajo Co, U_3O_8

MARCY-SHENANDOAH CORP
Jarvis Bldg, Durango, Colo
Pres & Gen Mgr: S Stokes Tomlin Jr
VP & Geol: E M Barge
Sec: R M Schell
Treas: Robert R Snodgrass
JACK DANIELS MINE, Cameron open pit, U_3O_8

MARVEL MNG CO
366 S 5th E, Salt Lake City
Pres: J A Minton
VP: D E Harrison
COLUMBIA MINE, Wenden, Arizona, Uravan Mineral Belt, various U_3O_8 properties
Under devel

MC CARRELL
C H McCarrell, Chambers
CHETO MINE, Bentonite, pit
Apache Co

MC CRACKEN MTN MINES CO
Box 118, Wenden
VP-Gen Mgr: Dan Wentworth
Supt: Percy H Ramsden
McCRACKEN MINE, Signal
Mohave Co, undergr, Ag, Pb
Under devel
100-TON MILL

MC FARLAND & HULLINGER
80 W Vine St, Box 238,
Tooele, Utah
Own: F G McFarland &
S R Hullinger
JOHNSON CAMP MINE,
Dragon, Cu, Zn
Supt: W D Nelson
Frm: Gunther Stoffers
Prod: 150 tons
ELGIN MINE, Box 811, Tucson
Pima Mng Dist, open pit, Cu
Supt: W D Nelson
Prod: 100 tons
Gen Supt: Wilmer D Nelson
Geol & Mine Eng: Gerald W
Irwin
Prod: 90 tons
400-TON MILL, Sahuarita
Supt: K L Erickson
No Prod
(see Utah)

MERCURIA MNG CO
c/o Oliver Brunson,
Tonto Basin
Pres: H Nichols
Sec: J Savoy
Treas: O Brunson
MINE, undergr, Hg

METATE ASBESTOS CORP
Box 11, Globe
Pres, Gen Mgr & Purch Agt:
Jack L Neal
Asst Gen Mgr & Sec:
Chas Ross Neal
LUCKY SEVEN AND EMSCO
MINES, San Carlos Apache
Indian Reservation, undergr
asbestos
Asst Supt: Harvey Collins
MILL

MILLS, EUGENE A
Riverside, Calif
BILLY MAC MINE, Yuma Co,
Au, Ag, Cu, Pb, Zn

MINES CONTRACTING, INC
PO Box 673, 471 E Center
St, Wickenburg
Pres: Ike W Kuntzo
Contract mining

MOHAVE COPPER, INC
6th Floor, Phoenix Title
& Trust Bldg, Phoenix
Pres: Robert T Englund
VP: Charles R Kimes
Sec: Joseph A Stave
MOHAVE COPPER MINE
undergr and open pit, Cu
Gen Mgr: William J Knuth
Gen Supt: Freeman Lomelino
Geol: F D MacKenzie
Under devel

MOORE, C L (Lessee)
Globe
FOURTH OF JULY MINE,
Gila Co

NASH MINES
406 Nash Bldg, Austin, Tex
Own: Jas P Nash
BONANZA, HOLLAND, KANSAS,
ESTELLA, BELMONT, MAINE,
NEW YORK, INDIANA
DUQUESNE, & EMPIRE MINES,
Patagonia mng dist

NASH & MC FARLAND
406 Nash Bldg, Austin, Tex
FLUX MINE, 10 mi from
Patagonia, undergr, Pb, Zn,
Ag
Gen Mgr: E W McFarland
Nogales
200-TON TRENCH MILL, 3 mi
from mine

NATIONAL GYPSUM CO
325 Delaware Ave,
Buffalo 2, N Y
QUARRY, Winkelman, gypsum
Plant Mgr: J E Irvin
Quarry Supt: Archie Lee
Prod: 400 tons
MILL, Phoenix
(see Ind, Iowa, Kans, Mich, NY,
Pa, Tex, Va)

NAVAJO LEYTSO MNG CO
2075 American Ave, Long
Beach, Calif.
THOMAS #1 MINE, Coconino
Co, U_3O_8

NEW APEX GOLD MINES
Box 565, Hayden
Own: B C Velasco
Treas: Consuelo P Velasco
MINES, undergr, Au, Ag, Cu
Under devel

NORGAARD, INAR
PO Box 394, Kellogg, Idaho
PO Box 71, Mexican Hat
Utah
MINE, U_3O_8

O'BRIEN, J
Parker
COPPER GIANT MINE, Yuma
Co, Cu

OLD GOLD MNG CO
Box 266, Selle
Own & Op: Maurice Hedderman
ALLISON MINE, Selle, undergr
Au, Si, Ag
Prod: 20 tons

PARAMOUNT MNG CORP
PO Box 4577, Tucson
Pres: I Icove
VP: S Makalla
Sec: J Sonenblick
MINE, Cortland, Cu
Geol: C Spalding
Met: S Makalla
Chem: G H Dixon
Mine Supt & Gen Mgr: W Ward
Prod: 2 1/2 tons daily
LEACHING UNDER GR PLANT

PAUL LIME PLANT INC
Paul Spur, Douglas
Pres: Howard E Ames, Jr
Sec-Treas: Harold C Hansen
PAUL LIME PLANT, Paul
Spur, open pit, lime rock
Gen Mgr: Howard E Ames, Jr
Met: Henry Bollweg
Supt: C T Bishop
Mech Eng: Rafael Sepulveda
Prod: 600 tons
LIME KILNS, rotary kilns,
crushing, grinding,
& screening plant

PERLITE INDUSTRIES OF ARIZONA
2123 E Henshaw Rd, Phoenix
Pres & Purch Agt:
Lewis Williams
VP: Reagon Williams
Sec: Sid Hopart
ADAMS MINE, Superior, open
pit, perlite*
Gen Mgr: Lewis Williams
Asst Gen Mgr: Lonnie Robbins
Prod: 75 tons
MILL, Superior, crushing
Mill Supt: John Graham
*(Mine operated by Arizona
Perlite Roofs, Inc, 2123
E Henshaw Rd, Phoenix)

PEVERILL & DANVERS
Box 55, Dragoon
BURRITO DE FIERRO MINE,
Cochise Co, Au, Ag, Cu,
Pb, Zn

PHELPS DODGE CORP WESTERN OPERATIONS
Douglas
WESTERN GEN OFFICES
VP & Gen Mgr, Western
Opers: W C Lawson
Asst Gen Mgr: J B Fullen
Office Mgr: H E Moore
Dir, Labor Rel: W J Uren
Ch Mech Eng: J H Davis, Jr
Head, Geophys Research:
E E Maillet
Gen Aud: G A Swanson
Asst Gen Purch Agt: K A Ables
West Traffic Mgr: A C Bacon
MORENCI BRANCH, Morenci
open pit mines, Cu Au, Ag, Mo
concentrator & smelter
Mgr: J A Lentz
NEW CORNELIA BRANCH, Ajo
open pit mines, Cu, Au, Ag,
concentrator & smelter
Mgr: J A Briggs
COPPER QUEEN BRANCH,
Bisbee, undergr, & open pit
mines, Cu, Au, Ag, concentrator
Mgr: W W Little

DOUGLAS REDUC WKS, Douglas smelter
Mgr: W W Little
Supt: M G Fowler
PHELPS DODGE MERC CO
Bisbee, Clifton, Douglas and
Morenci
Gen Mgr: H L Smith, Douglas
NEW CORNELIA COOP MERC
CO, Store at Ajo
Gen Mgr: H L Smith, Douglas
(see N Mex, N Y, Tex)

PHILLIPS ASBESTOS MINE
Globe
Mgr: Guy Phillips
MINE, Gila Co, Surface,
undergr asbestos
MILL

PIMA MNG CO
PO Box 7187, Tucson
Pres: H T Mudd
VP: P W Allen, A R Thomas
A D Christenson, H S Nye
Sec: D P Evans
Treas-Compt: L W Smith
PIMA MINE, 20 mi SW of
Tucson, open pit, Cu
Res Mgr: E D Spaulding
Asst Res Mgr: A A Freidman
Purch Agt: H E Eckstein
Office Mgr: D N Tremper
Ch Eng: J F Olk
Geol: J A Journeay
Safety Eng: A H Monroe
Met: R W Herlund
Elect Supt: A G Beebower
Mine Supt: R E Thurmond
Mine Frm: D W Rich
Mine Eng: Wm Pill
Ore Eng: Wm Bartlett
Pers Div: F A Rich
Prod: 4, 300 tons
3, 600-TON FLOT MILL, at
mine
Mill Supt: G A Komadina
Asst Mill Supt: J A Basarear
Mill Frm: W B Irby
Assay: P Flores
(see Calif)

POOR, L D
Cameron
DENBSTONE MINE, Navajo Co

PREUNINGER, FRED
Chloride
DELAWARE MINE, Mohave Co,
Au, Ag, Cu, Pb, Zn

RARE METALS CORP OF AMERICA
6th Floor, El Paso Natural
Gas Bldg, 315 E 2nd South,
Salt Lake City 11, Utah
300-TON ACID-LEACH MILL,
Tuba City
Mill Supt: C F Gommel
Asst Mill Supt: L O Davis
Mill Frm: L W Mead
Met: D B LeMaire
Chemist: G L Butt
HUSKON & RAMCO GROUPS,
Coconino Co, U_3O_8
(see Idaho, N Mex, Utah)

REHG, NORMAN M
(Owner)
Box 34, Dragoon
MINES, formerly KEYSTONE
MINES, Hagerman claim,
undergr, open pit, Zn, Cu,
Ag, Au
No Prod
200-TON FLOTATION MILL,
at mine

REYMERT EXT SILVER MINES
Box 531, Superior
REYMERT MINE, Pinal Co,
Au, Ag

ROGERS, H F
Box 2538, Flagstaff
ELWOOD THOMPSON #1,
TWILIGHT, YAZZIE #2, 102
MINES, Coconino Co, U_3O_8

ROYAL INVESTMENTS INC
1804 S 9th St, Las Vegas, Nev
Pres: Burton W Hancock
VP: Mildred Hancock, Alfred
Eliett
Sec: Frank E Hubert Jr
Treas: Herman Radzer
SCOTT-WEAVER, Yuma
Co, Cu, open pit
Under devel

SALERO-SANTA RITA MINES
Box 725, Patagonia
Own: Vil Rutherford
Pres: Jack Rutherford
JEFFERSON, EUREKA,
GEORGIA, MONTEZUMA,
TRUDY, TRENTON, JESUIT,
BLAND, ROYAL BLUE, ALICE
BLUE, DOUBLE EAGLE,
BURRO, ROSARIO and VICEROY
MINES, Tyndall mng dist, Santa
Cruz Co, undergr, Pb, Ag, Cu,
Zn, Au
Gen Mgr: Jack Rutherford
No Prod

SAN MANUEL COPPER CORP
Box 5417, San Manuel
Pres: W P Goes
VP: F H Buchella
J F Buchanan
Sec: F E Rinehart
Treas: W P Schmid
SAN MANUEL MINE, Cu Mo,
Ag, Au, undergr
Gen Mgr: F H Buchella
Asst Gen Mgr: J F Buchanan
Planng Eng: J D Pelletier
Geol: L A Thomas
Mech Supt: C A Bilson
Elec Eng: W Cann
Mine Supt: C L Pillar
Asst Mine Supt: E K Staley
Gen Mine Frm: C F Cigliana
Chf Mine Eng: Ray Tobie
Prod: 32, 000 tons
32, 000-TON FLOT MILL
Mill Supt: H K Burke
Prod: 150, 000, 000
REVERB SMELT
Supt: R C Wilson
Asst Supt: John Cullom

SAN PABLO MNG CO
Wickenburg
SAN PABLO MINE, Au, Ag, Cu
Pb, Zn

SANDCOP, INC
Box 140, Nogales
COPPER VALLEY MINE,
Pima Co, Au, Ag, Cu, Pb, Zn

SAWYER PETROLEUM CO
650 So Grand Ave, Los
Angeles 17, Calif
Pres: E W Sawyer, Jr
VP: K J A Sawyer, R D Sawyer
Sec: C W Faucett
TOM REED GOLD MINE, Oatman,
undergr, Au, Ag
Mine Eng: Joe Brandesburg
No Prod
(see Mont)

SCHEMMER, FRED D
Drawer 827, Prescott
COMMERCIAL MINE, Copper
Basin Dist, Yavapai Co, 7 mi
N of Kirkland Jct, undergr, Cu

SCHOLZ, E A & CAZIER, J H
1503 Black Mtn Rd
Hillsborough, Calif
COPPER KING MINE, 7 mi S
of Bagdad, undergr, Zn, Cu
No Prod
(see Calif)

SELLS, CATO
PO Box 253, Farmington
N Mex
SELLS MONUMENT #2 MINE
U_3O_8

SHANNON MNG CO (PERU MNG CO)
Box 309, Silver City, N Mex
SHANNON GROUP, Cochise
Co, Au, Ag
No Prod

SHATTUCK DENN MNG CORP
120 Broadway, New York 5,
N Y
Pres: Thomas Bardon
VP: Thomas V Tozzi
Asst VP: D M Kentro
T W Newell
Sec-Treas: John A Moss
IRON KING MINE, Humboldt,
undergr, Zn Pb, Au, Ag, Cu
Gen Mgr: D M Kentro
Met Eng: G W Clevenger
Ch Eng: B Waples, Jr
Ch Clk: W W Richardson
Purch Agt: J G McGregor
Mast Mech: Joe Kachnic
Mine Supt: Elmer Tomkinson
Asst Mine Supt: L Bombardieri
Gen Mine Frm: C Apperson
Mine Frm: R L Hurd
R J Williams
1, 100-TON FLOT MILL, at
mine
Supt: Thomas L Hoskins
Mill Frm: Chas Jones
Assay: W Statler
(see Colo, N Y, Utah)

SHAWN MNG CO
1980 Grand Ave, Phoenix
(INDIAN RESERVATION)
MINE, Gila Co, Au, Ag, Cu,
Pb, Zn

SISKON CORP
422 Gazette Bldg, Box 889
Reno, Nev
OLD RELIABLE MINE, Pinal
Co, Cu
No Prod

SMITH, H C
Skyline Dr, Box 347, Globe
DONNA LEE MINE, Gila Co,
U_3O_8
No Prod
HOPE & LITTLE JOE MINES,
Gila Co, U_3O_8

SMITH, VERNON
York, Pa
WALNUT CREEK, TONY MESA
& OTHER MINES, Gila Co,
asbestos
Under devel

H L SOKOL, INC
Cottonwood
Mgr: A McLain
COTTONWOOD DAISE MINE,
Yavapai Co

SOUTHWEST MINES CONTR CO
Box 1088, Prescott
GREAT SCOT MINE, 19 mi SE
of Prescott, undergr, Pb, Zn,
Au, Ag
Gen Mgr: Joe Ward
Under devel
WHITE PEARL, 7 mi S of
Prescot, undergr, WO_3
No Prod

STARNICK, JOE
Humboldt
HUMBOLDT MINE, Greenlee
Co, Au, Ag, Cu, Pb, Zn

STOCK, W M
3074 Adams Ave, San Diego
16, Calif
RIALTO MINE, Yuma Co, Au
Ag, Cu, Pb, Zn

STRONG & HARRIS, INC
4722 E Scarlett, Tucson
CORONADO MINE, Cochise
Co, Cu
GOLD HILL MINE, 11 mi SW of
Tucson, open cut, Pima Co, Cu
No Prod
SAGINAW MINE, Pima Co, Cu
No Prod

SUNRISE MNG CO
Drawer 37-B, Sahuarita
Pres: A P Simons
Gen Mgr: G W Irvin
GLOVE MINE, 8 mi E of Amado
in Santa Rita Mts, undergr, Pb
Ag, Zn
Mine Supt: Alfred M Durazo
Prod: 15 to 25 tons
PAYMASTER MINE
No Prod
(see Tex)

OTIS B TAYLOR
PO Box 723, Benson
STAR #1 MINE, U_3O_8

TENNESSEE COPPER CORP, MIAMI COPPER DIV
Box 100, Miami
VP & Gen Mgr: B R Coil
COPPER CITIES MINE, open
pit, Cu
12, 000-TON FLOT MILL
(see Tenn)

THUNDERBIRD METALLURGICAL, INC
2170 West Van Buren
Tolleson
Pres: A Conrad Stewart
VP: Willard Bell
Sec-Treas: Coit T Hughes
Purch Agt: R L Battelle
Gen Mgr: A C Stewart
Gen Supt: Matt Steffan
Met: Ted Biddle
500-TON GRAV MILL, 8 mi S of
Aguila
Mill Supt: Matt Steffan
Assay: Joseph Madison

TRANSARIZONA RESOURCES, INC
201 E 4th St, Casa Grande
Pres: J D Mason
VP: J M Pierce
Sec: G A Freeman
LAKESHORE MINE, open pit, Cu
Gen Mgr: G A Freeman
Gen Supt: Walter Tattrie
750-TON SEG-FLOT MILL
Under devel

TUCSON PERLITE, INC
4439 N Hwy Drive, Tucson
PROCESSING PLANT, Jaynes

TWILIGHT COMPANY
2057 Long Beach Blvd, Long Beach, Calif
ELWOOD THOMPSON #1 MINE, Coconino Co, U_3O_8

U S GUANO CORP
Box 886, Kingman
Pres & Treas: Frank E Ruben
VP: Samuel Reisman
Sec: M F Crompton
BAT CAVES, Grand Canyon
Gen Mgr: Varley Crompton
No Prod

UNITED STATES SMELTING REFINING & MNG CO
PO Box 2137
75 Federal St, Boston, Mass
Pres: C G Rice
Sr VP: J George Gange
VP: J B Metcalfe
GOLD MINE, Mohave Co
No Prod
(see Alaska, Mass, N Mex, Utah)

UNIVERSAL COPPER CORP
2308 E 17th St, Tucson
Pres: James E Gaylor
ALICE MINE, Troy, undergr, Cu, Pb, Au
No Prod

VANADIUM CORP OF AMERICA
Durango, Colo
Chm of Bd: William C Keeley
Pres: G L Weissenburger
Sec: D A Shriver
Treas: L C Miller
MONUMENT #2 MINE, Monument Valley, open pit, V_2O_5, U_3O_8
Mine Frm: C D Lane
MONUMENT VALLEY CONCENTRATOR, Monument Valley, upgrading plant, V_2O_5, U_3O_8
Conc Frm: R N Oldham
(see Colo, N Y, Utah)

VARIOUS METALS CO
Box 72, Heber
Own: John G Patrick
RAINBOW MNG GROUP, 13 mi SW Heber, undergr, surface, Mn
Mine Supt: W P Miller, Lessee
No Prod
20-TON FLOT MILL, at mine
Mill Supt: W P Miller
No Prod

VERMEERSCH, JULES L
4245 E Van Buren St, Phoenix 8
Own: Jules L Vermeersch
GIFT & MARICOPA MINES, Cave Cr mng dist, undergr, Au, Ag, Cu
MILL to be built

VIA DEVELOPMENT CORP
Box 4266, Santa Fe, N Mex
Pres: C W Via
VP: H H Via
Sec-Treas: Dale Trieder
MANGANESE MINE, Globe, undergr
Under devel
ASBESTOS MINE, Globe, undergr
No Prod
BLUE MOON MINE, S of Globe, undergr, open pit, Au Cu
No Prod
(see N Mex)

VULTURE BONANZA MINE
Wickenburg, & 712 E Broadway Glendale, Calif
Pres: Anthony Fenninger
VP & Secy: M E Fenninger
Treas& Purch Agt: Monty Jones
VULTURE BONANZA MINE, undergr, open pit, placer, Au, Ag, Cu
Gen Mgr: Jerry Wilson
Geol: Dr Erick Schleiff
Cons: R Siedlets
Under devel
(see Calif)

WAINWRIGHT, G and GULLEY, M E (Lessee)
Hayden
Mgr: G Wainwright
CHELLITO MINE, Gila Co

WALKER & PIERSON
Box 175, Oracle
SOUTHERN BELLE MINE, Pinal Co, Au, Ag, Cu, Pb, Zn

WALNUT GULCH MILL
Tombstone Partnership
MINE, undergr, Mn
Gen Mgr: H Hughes
No Prod
FLOT MILL, SE of Tombstone
Mill Supt: H Hughes
Prod: 50 tons of Mn daily

WEEKS, C F
PO Box 229, Kingman
WHITE SPAR MINE, Mohave Co, Silica

WESTERN GOLD & URANIUM INC
Box 95, Grand Canyon
Chmn of Bd: Richard Ince
VP: Dave Shirra
Sec: Berene Backus
Treas: J K Fakler
Mng Dir: C E Prior
ORPHAN MINE, Grand Canyon undergr, U_3O_8
Ch Geol: Max E Kofford
Mine Supt: Maurice Castagne
Asst Mine Supt: Robert Hartmann
Mine Frm: Jack Marso, Jim Kelle
Prod: 300 tons
(see Colo, Utah)

WILKERSON, J L & CO
Crown King
Mgr: Ed W Carls
SAVOY MINE in Yavapai Co, Pb, Ag
Under devel

C D WILSON, ESTATE OF
Box 102, Sahuarita
Executrix: Fern Wilson, 2239 La Mirande, Tucson
MARRAGANSETT MINE, Pima Co, open pit, Cu, Ag, Au
Prod: 250 tons per week

WOMBACKER, WILSON
Clarkdale
Mgr: C A Wombacker
LUCKY BIRD MINE, Yavapai Co

YUCCA MNG & MLG CO
Yucca
Mgr: M W Rankan
ANTLERS MINE & MILL, Mohave Co

ARKANSAS

ALUMINUM CO OF AMERICA (RAW MATERIALS DIV)
1501 Alcoa Bldg, Pittsburgh 19, Pa
Pres: Lawrence Litchfield, Jr
VP, Raw Mat & Ref: George W Streepey
Sec: A M Hunt
Treas: Matt W Stanley
Purch Agt: Thomas O English
Gen Mgr, Raw Mat Div: R F Miller
BAUXITE MINE, Bauxite, open pit, bauxite
Works Mgr: J T Watters
Asst Works Mgr: H W Rucker
Mine Supt: J E Cole
Geol: G C McBride
Mech Eng: M F Garlington
Mng Eng: R L Schell
Prod: 3,000 tons
(see Ill, Ky, Pa)

AMERICAN CYANAMID CO
Box 248, Benton
UAPAW MINE, 2 mi NE of Bauxite, surface, bauxite
Mgr: R H Harris
Mgr, Bauxite Mng: A W Montgomery
MILL, Benton
(see Fla, Ga, NY, Va)

ARKANSAS MNG & EXPLOR CO
Batesville
MINES, N of Batesville, open pit, Mn
No Prod

ARKHOLA SAND & GRAVEL CO
323 Merchants Bank Bldg, Ft Smith
Pres: Robert N Dills
VPs Bd Chmn: William Dills
Sec-Treas: Louise Kroh
Purch Agt: Cecil T Womack
Chief Eng: Harper S Jackson
MINE, Oklahoma
(see Okla)

BAXTER, LEONARD
Cushman
MINES, Cushman, open pit, Mn
No Prod

CAMPBELL BAUXITE CO
Sweet Home
Pres: J Clyde Campbell
PROCESSING PLANT, 1 1/2 mi SE of Little Rock, bauxite

DULIN BAUXITE CO, GYPSUM DIV
Sweet Home
MINE, Murfreesboro, undergr & open pit, gypsum

HOUSE, H L
Batesville
MINE, Independence Co, Mn
No Prod

MAGNET COVE BARIUM CORP
Box 6504, Houston 5, Texas
MINE, Magnet Cove, undergr, barite
Gen Mgr: James S Starks
Mine Supt: Harry M Verser
Met: James T Gullett.
Mine Eng: James C Hall
Geol: Harry Metcalf
Mine Frm: Roy York
Prod: 1,200 tons
1,200-TON FLOT MILL, Malvern
Mill Supt: E H Spraggins
(see Fla, Mo, Nev, Tex, Wyo)

MILLER & MC GEE
Batesville
MINES, N of Batesville, open pit, undergr, Mn
No Prod

NATL LEAD CO BAROID DIV
PO Box 358, Malvern
Gen Supt: E C Farrell
Asst Supt: W A Halbert
Mine Supt: A J Higgins
Mine Frm: James E Battreal
MINE, Malvern open pit, barite
Prod: 1,500 tons
1,500-TON FLOT MILL, 10 mi N of Malvern
Mill Supt: W F Brooks
Asst Mill Supt: V C Hays
Mill Frm: J D Wallace
(see Calif, Colo, La, Mont, Mo, Nev, N Y, Tenn, Tex, Wyo)

NORTON CO
1 New Bond St, Worcester 6, Mass
Pres: Milton P Higgins
Exec VP: Ralph F Gow
Sec: Richard Prouty
Treas: Wm H Perks
Gen Purch Agt: Geo D Seguin
NORTON PLANT, Bauxite, Mn
No Prod

POROCEL CORP (SUBSID MINERALS & CHEM PHILIPP CORP)
Essex Turnpike, Menlo Park, N Y
Pres: C A Specht
VP: A G Blake
Sec: M C Flint
Treas: R J Brockmann
Prod Div: A C Todd, Jr
MINE, Little Rock, open pit, bauxite
Gen Mgr: H E Pike
(see N J, Minerals & Chem Philipp Corp, Ga & Va)

REYNOLDS MNG CORP
Reynolds Metal Bldg, Richmond 18, Va
Pres: Walter A Rice
VP: R H Zeglin
Purch Agt: J W Glover
Exec Asst To President: Sheldon P Wimpfen
MINE, PO Box 398, Bauxite, undergr & open pit, bauxite
Gen Mgr: R H Zeglin
Geol: John H Moses
Surface Supt: J A Fuller
Undergr Supt: G M Wagner
Tech Asst: Rolf W Roley
Staff Asst: Bruce A Randall
Staff Eng: Grant Ruhly
Sr Mng Eng: J R Krause
Prod: 1,800 tons
(see Va)

RUSH CREEK MNG & EXP CO, INC
Box 545, Yellville
Pres: C T Black
VP-Treas: W C Barnett
Sec: Garvin Fitton
RUSH DIST, Yellville, undergr open pit, Zn
Gen Mgr: Glen Leatherman
Supt: Van Walters
Asst Mine Supt: Gus Setzer
Under devel
300-TON FLOT MILL, Yellville, Zn
Supt: Van Walters
Asst Supt: John McNemar

STAUFFER CHEMICAL CO, CONSOLIDATED CHEMICAL INDUSTRIES DIVN
PEISER SPUR MINES & PLANT, PO Box 65, Arch St, Substation, Little Rock, open pit, bauxite
Res Mgr: S M Stelling
Plnt Mgr: E F Ackerman

U S MANGANESE CORP
Batesville
MINE, Mn
No Prod

UTLEY, HARVEY
Box 431, Batesville
MINES, N of Batesville, open pit, Mn
10-TON MILL, Ind County
Assayer: Bruce Williams
No Prod

CALIFORNIA

ADELAIDE MINE
435 Hillcrest Rd, San Mateo
Own: A W Stickney
MINE, Mariposa Co, undergr, Au
No Prod

AGRICULTURAL MINERAL & FERTILIZER CO
c/o A D Sousa, PO Box 832, Los Banos
MINE, Los Banos, gypsum

AIROX COMPANY
307 W Eighth St, Los Angeles 14
MINE, Casmalia, Santa Barbara Co, diatomaceous earth

AMERICAN CHROME CO
1 Montgomery St San Francisco
Pres: Willis A Swan
VP & Gen Mgr: John Bley, Nye, Mont
VP: John L Lukens
Sec: Geo M Spradling
Treas: Wm Groody
Purch Agt: D W Graves
MOUAT MINE, Nye, Montana
(see Montana)

AMERICAN EXPLORATION & MNG CO
2300 Russ Bldg, San Francisco 4
VP: E A Scholz
Sec: D Duke
Purch Agr: H A Gabriel
PROPERTIES under general exploration
Chief Geol: Hatfield Goudey

AMERICAN MINERAL CO
840 S Mission Rd Los Angeles 23
VP: W A Merle & Richard F Brooks
VP-Treas: E J Ellsworth
Purch Agt: R D Murphy
WHITE ROCK MINE, Cantil open pit, ceramic clays
Mine Supt: Paul Edgemon
Prod: 1,000-1,200 tons per month
MARTER-WHITE MINE, Bryman, open pit, ceramic clay
Prod: 1,000-1,200 tons per month
100-TON BALL MILL & DRYER& & RAYMOND ROLLER MILL, at mine

AMERICAN POTASH & CHEM CORP
3000 W 6th St, Los Angeles 54
Pres: Peter Colefax
VP, Mktg: Wm J F Francis
Sec: Fred Marsic
Treas: L A Adams
Purch Agt: Lawrence H Corn Cornelius
SEARLES LAKE MINE, Lake Brines, potash, borax soda salts, Br, Li
MILL & SMELTER, Trona

AMERICAN SMELTING & REFINING CO
PO Box 52, Selby
MINING DEPT
BLAST FURNACE, Selby, lead
Mgr: J T Roy
Asst Mgr: G H Playter
Gen Supt: B K Shedd
Purch Agt: J M Hanna
Smelter Supt: C P Gough
Refin Supt: A L Labbe, Jr
Mach Supt: M E Griffith
Plant Eng: J H Green
(see Ariz, Colo, Idaho, Ill, Md, Mont, Nebr, N J, N Mex, N Y, Tex, Utah, Wash)

ANACONDA COMPANY, THE
25 Broadway, New York 4, NY
Chmn of Bd: C E Weed
Pres: C M Brinckerhoff
Exec VP: Edward S McGlone
Sec-Treas: Ralph E Schneider
Dir of Purch: A Baird Harris
DARWIN MINE, Darwin, undergr, Pb, Zn, Ag
No Prod
FLOT MILL, Darwin
No Prod
SHOSHONE MINE, Tecopa undergr, Pb, Ag
No Prod
125-TON FLOT MILL, at Shoshone mine
No Prod
(see Idaho, Mont, Nev, N Mex, N Y)

ANTONOWITSCH, JOHN K
Rt 2, Box 2052, Grass Valley
INDIANA MINE, Grass Valley, Nevada Co, Au, undergr
Under devel
10-TON MILL

ASBESTOS BONDING CO
4459 Redwood Rd, Napa
PHOENIX MINE, Steel Canyon, Napa Co, chrysotile asbestos

B M M Y MNG BOARD
980 S Dora St, Ukiah
Pres: M M Morris
VP: W Mayfield
Sec-Treas: C F Yuen
EMPRESS MINE, Largo, Mendocino Co, open pit, HgS
Minde Supt: R A Beck
Under devel
MILL, Pilot plant only
SMELTER, retort

BAKER & SON MNG & DEV
5350 So Virginia St, Reno Nev
Part: Gene Baker, George Baker
BARBARA L (9 claims), LOLA G (7 claims) and YELLOW JACKET (9 claims) MINES, open pit, U_3O_8
No Prod

BARE, PAUL
Box 536, Lone Pine
SANTA ROSA MINE, Keeler
Inyo Co, Pb, Zn, Ag

BASALT ROCK CO LTD
Eighth & River Sts, Napa
MINE, Napa, diatomaceous e earth

BEAURAGARD, D J & A E
607 W Pine, Bishop
SIERRA WAHINGTON GRP, Mono Co, Au, Ag
No Prod

BENNETT, K M
252 Grand Pre Blvd, Playa Del Rey
OWL HOLE MINE, Baker, Mn

BEST MINES CO
Box 177, Downieville
Pres: I L Best
VP & Gen Mgr: L L Huelsdonk
Treas: Franklin C Stark
GOLD BLUFF, BRUSH CREEK & OXFORD MINES, undergr, Au
Mine Supt: W T Reed Jr
Engr: Jay Folsom
Master Mech: A R Hinton
FLOT MILL
Supt: John Folsom
Frm: Vernon Huffman

BIAGGINI, HAROLD
PO Box 753, Paso Robles
BUENA VISTA MINE, Adelaida, Hg

BLACK GIRL MINES CO
271 N Monterey Rd, Palm Springs
VP & Gen Mgr: J M McFadden
Sec: Doris E McFadden
Geol: C M Shaw
(see Colo)

BLACK OAK MINE
Garden Valley
Own: Russell J Wilson
MINE, Au
No Prod

BLUE DIAMOND CORP
1850 S Alameda St, Los Angeles 54
Pres: N J Redmond
VP, Prod: W G Bradley
Sec: Gene G Curry
VP-Treas: T L Donoghue
Purch Agt: B M Martz
(see Nev)

BLUMER, A M
485 California St
San Francisco
MINE, Davenport, Santa Cruz Co, potash

BRADLEY, P R & H
Valley Springs
PENN MINE, Calaveras Co, Au, Ag, Cu
Under devel

BRADLEY & EKSTROM INC
24 California St
San Francisco
Pres: E O Ekstrom
VP & Gen Mgr: R F Heimke
MINES, Ariz, Calif, Nev, Utah Idaho, Ore, surface & undergr, Cr, Fe, CaF_2, Mn, WO_3, rare earths, asbestos
Supt: C Robinson

BRADLEY MNG CO
660 Market St, Rm 515
San Francisco 4
Pres: Jas P Bradley
Sec-Treas: G C Orton
REED MINE, Lower Lake, Hg
(Leased)
SULPHUR BANK MINE, Clearlake Oaks, Hg
(see Idaho)

BRIGGS, HARRY E
Box 613, Trona
RED CLOUD MINE, 10 mi E of Ballarat, Panamint Mts, undergr, Au, Ag, Pb
Under devel
SOUTHERN HOMESTAKE MINE, 8 mi S of Ballarat, undergr, Au, Ag
Under devel
GOLDEN EAGLE MINE, 5 mi SE of Ballarat, undergr, Au, Ag, Pb
10-TON GRAV MILL, amalgamation & cyanidation

BROWN BEAR MINES
PO Box 66, French Gulch, Shasta Co
Cons Geol & Mng Eng:
E E Erich
BROWN BEAR, TANGLE BLUE & REID MINES, undergr, Au
No Prod

BUENA VISTA MINE
PO Box 753, Paso Robles
Own: Harold J Biaggini
BUENA VISTA MINE, Adelaide Rd, 17 mi W of Paso Robles, open pit, Hg
Mine Supt: Rudolph Ruda
Prod: 115 tons
35-TON MILL at mine
Mill Supt: Errol Dodd
Asst Mill Supt: Dee Fitshugh

BUENA VISTA NO 2 MINE
Box 25, Redding
Own: H G Graves
MINE, 3 mi W of Redding, Au Cu, WO_3
20-TON FLOT MILL
No Prod

BUNKER HILL CO, THE
The Bunker Hill Bldg
660 Market St, San Francisco
Pres: Charles E Schwab
VP: D L Feathers, R H Cutting and H E Lee
Sec: D L Feathers
Treas: Emmett G Solomon
Purch Agt: Gil Mayes
(see Idaho, Wash)

BURRO SHOE MNG CO, INC
2033 Baylor St, Duarte
Pres: Audley L Smith
VP: Cash L Swinney
Sec-Treas: Wm J Clark
BURRO SHOE MINE, Saline Valley Dist, undergr, open pit, Cu, Mo, Au, Ag
Gen Mgr & Geol: A L Smith
Gen Supt: Cash Swinney
Under devel

BURTON BROS, INC
Rosamond
Pres & Gen Mgr: C G Burton
TROPICO MINE, 5 mi W of Rosamond, undergr, Au, Ag
Asst Mgr: G A Settle
No Prod
CACTUS QUEEN MINE, 10 mi NW of Rosamond
100-TON CYANIDE MILL, at mine
Frm: Alec Burton
SMELTER, at mill
No Prod

CAL-MERC MNG CO
PO Box 637, Hollister
JUNIPER MINE, Paicines, Hg

CALARI MNG CO
3030 Linden Ave, Long Beach 7, Pres L F Albrecht
Sec-Treas: C M Smith, 5863 Olive Ave, Long Beach 5
(see Ariz)

CALIFORNIA LIMESTONE PRODUCTS
Rt 1, Box 55, Blythe
Pres & Mgr: R S Hall
Sec-Treas: Maurice Willows, Jr
LANGDON MINE, Box 1064, Blythe, 22 mi NW of Blythe, undergr& surface, Mn
Gen Supt: James F Carr
No Prod

CALRADO DEVEL CO
Rt 1, Box 56, Blythe
Co-Part: R S Hall & Maurice Willows Jr
BLACK JACK-ARLINGTON MANGANESE MINE, 23 mi NW of Blythe, surface & undergr
(Leased to Blythe Manganese Co)

CALZONE MNG CO
281 Maryland Parkway, Las Vegas, Nev
RUBY J (BLACK MAGIC) MINE, Baker, Mn
(see Nev)

CARRIGAN MINES, INC
PO Box 3262, Hayward
Pres: E B Swanson
VP, G E Martin
Sec: Marjorie R Johnson
Treas: Irene Bickel
Purch Agt: E B Swanson
Dir-Field Mgr: F E Walker
Dir: K W Austin
Dir-Field Supt: J D Long
AUTUNITE URANIUM MINE, Range 10 E, Township 5 N Summit Dist
M D B M, Tuolumne Co, Calif, 13 mi above Carters
Strawberry Lodge, located on Hwy 108, at intersection of
Prod: Blocking out ore bodies by rotary drilling
Gen Mgr: E B Swanson
Gen Supt: F E Walker
Geol: E Boudreau
MILL, U_3O_8 to be built in area

THE CATELLA CORP
983 Mills Bldg, San Francisco
ALTOONA MINE, Castle Cr, Hg

CECIL CREEK ENTERPRISES
Cecilville
CECIL CREEK LODE #1 AND 2, CECIL CREEK ANNEX, Cecil Cr, placer, Au, Ag
Prod: 25 tons
Under devel
LONG SHOT PLACER, St Claire Cr, placer, Au, Ag
25-TON GRAVITY MILL, on Cecil Cr

CELTOR CHEMICAL CORP
Box 656, Arcata
Pres: C C Celestre
VP: E Torre
Sec & Treas: K M Watson
COPPER BLUFF MINE, Hoopa, Cu
FLOT PLANT, Samoa
Humboldt Co
Supt: J MacGinniss
Met: A Burwell

CHRISTY MINES
317 W Miner, Yreka
Own: R J Rustenbach
CHRISTY MINES, undergr, Au, Ag
Gen Mgr: R J Rustenbach
Geol: Carl Yates
Prod: 12 tons
20-TON GRAVITY MILL, Yreka
Mill Supt: R J Rustenbach
Assayer: Carl Yates

COG MINERALS CORP
Denver Club Bldg, Denver Colo
Pres: W C Norman
VP & Treas: F O Griffin
Sec: C W McDermott
ABBOTT MINE, Williams, undergr, Hg
Gen Mgr: F A Seeton
Mine Mgr: C O Reed
Geol: F D Hanson
Prod: 80 tons
80-TON-2-ROTARY FURNACE MILL, at mine portal, Hg
(see Colo)

COLUMBIA IRON MNG CO (SUBSID OF U S STEEL CORP)
120 Montgomery St
San Francisco
Pres: J D McCall
Exec: VP: L J Westhaver
VP, Oprt: D E Rice
Sec: D J McDaniel
Mgr, Land & Exploration: R C Talbott
Ch Eng: W F Fruden
Dir, Ind Rel & Safe: C T Spivey
Dir, Purch: R D Crowley
(see U S Steel Corp, Alaska, Ala, Minn, Pa, Tenn, Utah)

COLUMBIA-SOUTHERN CHEM CORP - (SUBSID OF PITTSBURGH PLATE GLASS CO)
#1 Gateway Center
Pittsburgh 22, Pa
PLANT, Bartlett, Owens Lake Dist, Borax
Plant Supt: Carl P Budke

CORDERO MNG CO
131 University Ave, Palo Alto
VP: S H Williston
Gen Mgr: J Eldon Gilbert
MAY LUNDY MINE, Mono 10 mi W of Mono Lake, Au
No Prod
QUIEN SABE MINE, Hollister, 19 mi E of Hollister, undergr Sb
No Prod
Gen Supt: Herbert Mitchell
(see Idaho, Nevada, Alaska)

CORONADO COPPER & ZINC CO
523 W 6th St, Los Angeles 14
Pres: K Lieber
VP: H T Mudd, P W Allen & H S Nye
Sec: L A Garrett
Treas: H S Nye
(see Ariz)

CRATER CHEMICAL CORP
254 Yucca Vine Bldg
Los Angeles 28
Pres: Lillie Pulos
VP: Conn Pulos
Sec-Treas: Lottie Wind
CRATER CHEMICAL MINE, open pit, gypsite agricultural
Prod: 25 tons daily
(Leased to Santa Anita Growers Co, Amboy, Calif)

CROWDER & BUTLER
PO Box 409, Grass Valley
LIME KILN PLACER, Nevada Co, Doodle Bug dredge, Au, Ag
Gen Mgr: Ken Crowder
Asst Gen Mgr: Archie Butler
Gen Supt: Chester C Butler

CROWN URANIUM CO
301 S Lincoln Ave, Taft
MINE, Taft, Kern Co, S

CRYSTAL BALL MNG CO
21660 Bertram Rd, San Jose
Pres & Man Dir: Woodrow Goodman
VP & Gen Supt: Frank V Thompson
MINE, Mine Hill, Almaden, undergr & open pit, cinnabar
Gen Supt: Theron Kidd
Mech Eng: Arthur Merrill
Prod: 50 tons
MILL, Santa Clara Co
Cap: 50 tons cinnabar ore daily

CULVER-BAER MINE
12200 Geyser Road, Cloverdale
Pres & Gen Mgr: A Rarabaugh
MINES, undergr, Hg
80-TON MILL, at mine
Under devel

CUMMINGS-ROBERTS
739 N Highland Ave
Los Angeles 38
Gen Part: H Evan Roberts
(see Mont)

CYPRUS MINES CORP
1206 Pacific Mutual Bldg
Los Angeles 14
Pres: H T Mudd
VP: A R Thomas
VP & Treas: H S Nye
Sec: L A Garrett
Purch Agt: W F Stover
(see Ariz, Colo)

DAKIN CO
2811 Hillside Dr, Burlingame
Pres: Fred H Dakin
VP: Wesley W Kergan
Sec: Henrietta Dakin
UNCLE SAM MINE, 20 mi NW of Redding, Shasta Co, undergr Au, Ag, Cu
No Prod

DE ZAN, GENE
926 E Ave B, Blythe
PIONEER MINE, Palo Verde, Mn

DEL MONTE PROPERTIES CO, SAND DIV
Box 150, Pacific Grove
Pres: Richard Osborne
Gen Mgr: H H Bein
Sales Mgr: P C Valentine
Met: Henry Benech
Gen Supt: C J Houseman
DELMONTE SAND PLANT, Del Monte Forest, Pebble Beach, open pit, surface, glass and quartz, feldspar, gr sand
Prod: 800 tons
800-TON FLOT MILL

DESERT MINERALS INC & AMERICAN MINERAL C
840 S Mission Rd,
Los Angeles 23
Pres E J Ellsworth
VP, R F Brooks
Purch Agt: R D Murphy
P V MINE, clay and talc
100-TON MILL, Los Angeles
Mill Supt: W A Merle

DIAMOND SPRINGS LIME CO
PO Box 409, Diamond Springs
Pres & Gen Mgr: R S Locke
VP & Sec: P A Fout
Treas & Purch Agt: B Flynn
DIAMOND QUARRIES, Diamond Springs, open pit, limestone
Gen Supt: Jim Heyne
MOUNTAIN QUARRIES, Undergr
Gen Mgr: Cliff Nichols

DICKEY EXPLOR CO
Alleghany
ORIENTAL LODE MINE, undergr, Au, Ag
Gen Mgr: Donald R Dickey
Geol: W Fuller
No Prod
75-TON FLOT-GRAV MILL, at mine

DONM R GOLD MINES
3 Harbor Dr, Corte Madera
Own: Donald & Marjorie Bennett
(see Idaho)

EAST RIDGE CO
633 Shatto Place,
Los Angeles 5
Pres: Carlton E Byrne
VP: F Moldenhauer
Sec: Alice Davenport
(see Colo)

ECHLIN, C R
Box 245, Grass Valley
DEPOT HILL MINE, Sierra Co, Au
(Leased from JG Brown & Blanche F Brown)

EL DORADO LIMESTONE CO
Shingle Springs
Pres: J H Bell
VP: E O Schnetz
Sec: H P Armes
Purch Agt: G L Darrington
Gen Supt: W Stinson
Sec: H P Armes
Elec Eng: Paul Ransom
LIMESTONE MINE, 4 1/2 mi SW of Shingle Springs, El Dorado Co, undergr, limestone
Mine Supt: F G De Berry
Prod: 600 tons
700-TON MILL, crushing, screening
Mill Supt: Paul Ransom

EL DORADO PLUMBAGO MINES CONS, INC
211 Octavia St, San Francisco
Pres & Mine Mgr: Roland P DeGrio
VP: Ernest G Heath
2nd VP: Theodore H Paoli
Sec-Treas: Richard H Wong
Asst Sec-Treas: Geo V Baptista
EL DORADO PLUMBAGO MINE, Box 903, Alleghany, Sierra Co, undergr, Au
Geol: Thomas H Taylor
Under Devel
Prod: 12 tons per shift
50-TON FLOT MILL, at mine

EL HOMBRE MINES LTD
917 Hopi Lane, Las Vegas, Nev
Pres: R Michael Mann
VP: Lester Root
Sec: Edna Root
Treas: Mary Lou Mann
MARY LOU #1 & 2 MINES, Mineral Hills, Ivanpah Dist, undergr, Pb, Ag
Under devel
POWER MINE, Clark Mt Dist, undergr, Cu
Under devel
L-M #1-2-3, Riggs Wash, Silver Lake Dist, undergr, Ni, Co
Under devel

ELECTRONIC MINERALS & DEVELOPMENT CO
PO Box 269, Santa Clara
FLORENCE MACK MINE, Hernandez, San Benito Co, Hg

ESPY MNG CO
PO Box 43, Nevada City
ESPY MINE, Pike, Sierra Co, dragline dredge, Au

EXCEL-MINERAL CO
3451 E 26th St
Los Angeles 23
MINE, Button Willow, Kern Co, diatomaceous earth

C L FANNIN AGRICULTURAL GYPSUM MINES
Route 1, Box 7, Wasco
Own: C L Fannin
AGRICULTURAL GYPSUM MINES, Lost Hills Rd, Lost Hills, open pit, agric gypsum
Gen Mgr: C L Fannin
Lab: John Rutledge
Mine Frm: Todd Velvick
Prod: 750 tons
1000-TON MILL, at mine

FIBREBOARD PAPER PRODUCTS CORP
475 Brannan St,
San Francisco 19
Pres: E W Carey
VP: M R Baruh, G W Burgess, J H Grady, J B Fagot, A S Halley, J F Havard, O C Majors, W K Spence
Sec: J S Mitchell
Treas: V H Erickson
Purch Agt: B A Wilson
(see Colo, Nev)

FIGUEROA, ALFRED
Box 453, Blythe
ARLINGTON GROUP, Blythe, Mn

FLINTKOTE COMPANY, THE (US LIME PRODUCTS DIV)
2244 Beverly Blvd,
Los Angeles 57
Pres: G J Pecaro
VP& Gen Mgr: Kennedy Ellsworth
Asst Gen Mgr: Hardin Stephens
Prod Mgr: L N Grindell
Res Mgr- Nev, Ariz: J C MacDonald
SONORA MINE, Tuolumne Co, under gr, limestone
Res Mgr: Wm McCandlish
Prod: 400 tons
(see Ariz, Nev)

FONES, R A
Paicines, San Benito Co
Op: R A Fones
TURKEY HILL MINE, cinnabar
Under devel

FOOD MACHINERY AND CHEMICAL CORP (MINERAL PRODUCTS DIV)
Box 337, Newark
Res Mgr: S M Cimino
Asst to Res Mgr: D C Brinton
Oper Supt: V O Kaehler
MINERAL PRODUCTS DIV, Box 961, Hollister, surface, dolomite
Mine Supt: R Swindlehurst
Prod: 500 tons
600-TON MILL, Hollister
Mill Supt: R Swindlehurst
Assay: Norman Cunha
(see Idaho)

FOREMAN & FOREMAN
Sheridan, Mont
DEFENSE MINE, Inyo Co, Panamint Springs, Pb, Ag, Au, Zn

FOREST MINES, INC
Forest City, via Alleghany PO, Sierra County
Pres: Cecil T Vivian
VP & Treas: Virginia A Vivian
Sec: James H Beach
NORTH FORK MINE, undergr & placer, Au, quartz
Mine Supt: Cecil T Vivian

FOSTER, CLYDE T
PO Box 382, Mariposa
SWEETWATER MINE, Mariposa County, undergr, Au, Ag
Mine Frm: C W Fox
Prod: 10 tons daily
25-TON CHILLIAN FLOT MILL, at mine

4-D MNG CO
c/o Clyde Hewitt
Box 276, Johannasburg
YELLOW ASTER MINE, Kern County, Au, Ag

FOUR-GEE MINE
Rt 1, Box 999, Escondido
Own: H G Golem
FOUR-GEE MINE, open pit, pyrophyllite, alum, silica ore
Gen Mgr: H G Golem
Asst Gen Mgr & Mech Eng: Carl Golem
Prod: 50 tons

FRESNO LAND DEVELOPMENT CO
440 Blackstone Ave, Fresno
JESSE BELLE MINE, Daulton, Madera Co, Cu

FRIDAY NICKEL SYNDICATE
3105 Wilshire Blvd
Los Angeles 5
Pres: D B MacAfee
VP: Dudley Cornell
Sec: Saul J Bernard
Treas: Marvin L Tragerman
Tech Dir: M W MacAfee
FRIDAY NICKEL MINE, Julian undergr, Ni, Co, S
Under devel

GIBRALTAR MNG CO INC
Box 218, Paramount
Pres: Wm Sievers
VP: Raymond Sievers
Sec-Treas: Robert Price
GIBRALTAR GROUP, 19 mi NE of Santa Barbara, over Depression Dr, on Gibraltar Dam in Los Padres Natl Forest, open pit, undergr, quicksilver
Prod: 80 tons
Gen Mgr: Wm Sievers
Mine Supt: Arthur Stafford
100-TON MILL, Rotary Furnace

GIBSON, H C
1681 E Main, Brawley
MARY ELLEN #1, MINE, Palo Verde, Mn

GIPSY MINE & MILL CO
11115 Wicks, Sun Valley
Pres & Gen Mgr: J H Bennett
Sec-Treas: A E Bennett
GIPSY MINE, Sun Valley, open pit, Au, Ag, Pb, WO_4
Gen Mgr: John Leonetti
Under devel
60-TON FLOT-GRAV MILL
Bakersfield

GISH BROTHERS
455 South 12th, San Jose
NEW ALMADEN MINE, Almaden Hg

GLADDING, McBEAN & CO
2901 Los Feliz Blvd, Los Angeles, 39
Pres: C W Plaje
Sec: R A Eccles
PLANTS, Corona, Ione, Lincoln, Pittsburgh, South Gate, Los Angeles
MINES, Amador, Inyo, Kern Los Angeles, Orange, Placer Riverside, San Bernardino & Yuba Counties

GLENN CO
703 37th Ave, Oakland 1
Own & Gen Mgr: George G Glenn
Gen Supt: Harry Odgers
MARBLE SPRINGS MINE, 12 mi E of Coulterville, undergr, Au, Ag, Pb
50-TON FLOT MILL
Mill Supt: Frank Lane
No Prod

GLIKO, F P
PO Box 1027, Grass Valley
EMPIRE-STAR MINE, Grass Valley, Nevada Co, Au, Ag

GOLD HILL DREDGING CO
311 California St
San Francisco
Pres: J J Coney
Sec: R E McCarthy
Treas: C A Ames
Purch Agt: E O Perkins
PLACER PROP on Mokelumne Riv in San Joaquin Co, Feather Riv in Butte Co, bucketline, Ag Au
Supt: H L Coney
No Prod

GRANTHAM MINES
1915 Coast Hwy
Laguna Beach
Own: Louise Grantham
WARM SPRINGS TALC DEPOSIT, Inyo Co, Talc
BIG TALC, 48 mi NW of Shoshone
Mine Supt: William P Ryan
Mine Frm: Don Williams
Mine Eng: R H Franklin

GREAT LAKES CARBON CORP (MNG & MINERAL PROD DIV)
612 S Flower St, Los Angeles
Pres: G Skakel Jr
VP & Gen Mgr: D L Marlett
Asst Gen Mgr & Sales Mgr: J E Moran
Purch Agt: J Hughes
Tech Dir: P Leppla
GREAT LAKES CARBON CORP QUARRY, 8 mi E Lompoc, open pit, diatomaceous silica
Chief Geol: J W Reinhart
Prod Dpt Mgr: E A Harris
Mng Dpt Mgr: W D Stone
Chf Eng: D F Dryemid
Supervisor: J W Rood
Asst Superv: J Guaderrama
Prod: 500-800 tons
400-TON MILL, Plant #5, 8 mi E Lompoc
Plant Supt: E D Ingram
Asst Plant Supt: P Highfill
Plant Frm: M Gryczko
Chemist: J Girard
Safety Eng: W G Stier
(see Colo, N Mex, Nev, Ariz)

GREAT WESTERN MNG CORP (NO AMERICAN DIV)
Gen Offices:
8755 Colgate Ave
Los Angeles 46
Pres: Harry Fracter
VP: D Cauldwell
Sec: J Cauldwell
Asst Sec & Purch Agt: R Faber
Treas: M Landwirth
Sales & Research: David Valandigham
(see Nev)

HAMLIN EXPLORATION & MNG CO
1443 Montgomery Ave,
Glendale 2
Pres: William C Hamlin
VP: Robert G Hamlin
Sec-Treas: Clyde H Hamlin
HAMLIN-LEDDY MINE, 13 mi SE of 29 Palms, San Bernardino Co, open pit, BeO, Au, building stone,
Mine Supt: Jack W Hamlin
Under devel
(see Wyo)

C W HARRIS MINE
Box 117, Rancho Santa Fe
Own: C W Harris
MINE, open pit, Pyrophyllite
Mine Frm: R C Harris
Prod: 15 tons
50-TON MILL, 2 mi E of Rancho Santa Fe

HARRISON MNG CO
9415 Long Beach Blvd
Southgate
MAGNA MINE, Randsburg, Kern Co, Mn

HASLOE MNG CO, INC
15610 Center Way, Guerneville
HASLOE MINE, Coulterville, lode, Au

HAUN, EDGAR T
2031 Jonathan Rd, San Jose
NEW ALMADEN (DRY GULCH) MINE, Almaden, Hg

HAZEL CREEK MNG CORP
PO Box 3508, No Sacramento
HAZEL CREEK MINE, Sly Park, El Dorado Co, Au, lode

HENRY, C PARK
50 The Uplands, Berkeley
MINE, S-BAR-S RANCH, Lake Co, S

HOFFMAN, G H & HALL, J W
Box 142, Proberta
CHANCHELULLU GROUP, 5 mi N of Knob, open pit, Au, Ag, Cu
Under devel

HOLLOWAY, H M
714 Sixth St, Wasco
MINE, Lost Hills, Kern Co, gypsum

HOLDING MINE & DEVEL CO
1350 N Lemon Ave
Menlo Park
Pres: Wm C Holding
VP & Gen Mgr: P C Hilen
SHOESTRING TUNGSTEN MINE Mono Co, Tioga Pass near Lee, Vining Canyon, undergr, open pit, WO_3, Mo, Ag
No Prod

HOMESTAKE MNG CO
100 Bush St, San Francisco
Pres: Donald H McLaughlin
VP: James W Swent, Guy N Bjorge A A Gulick, Wallace MacGregor
VP & Gen Mgr of Oper: A H Shoemaker
Sec-Treas: John W Hamilton
Asst Sec: Wm W Murray, M A Mason
Purch Agt: H D Anderson
Chief Geol: Paul C Henshaw
(see So Dak, Utah, Wyo, Homestake Partners N Mex)

HUB MNG CO, INC
Alleghany
Pres & Mine Mgr: Roland De Grio
VP: Harold Moeglin
Sec-Treas: Anthony Shalter
Eng: Thomas Taylor
MINE
No Prod

HUGHES, HAROLD
Rt 1, Box 176, San Martin
NEW ALMADEN MINE, Almaden, Hg

HUNTLEY INDUSTRIAL MINERALS INC
Box 305, Bishop
Pres: W H Huntley
VP: D T Davis
Sec-Treas: Cecile M Huntley
COLTON MINE, 20 mi NE of Bishop, open pit, pyrophyllite
PACIFIC PYROPHYLLITE MINE, 20 mi N of Laws, open pit, pyrophyllite
HUNTLEY TALC MINE, 43 mi SE of Big Pine, undergr, open pit, talc
LITTLE ANTELOPE CLAY MINE, Hot Creek Mono Co, open pit, White Kaolin Clay
Mine Supt: D T Davis
Total Prod: 100 tons
200-TON RAYMOND & AIR SEPARATION MILL, Laws
Mill Supt: A Wooten
Assay: Kenneth King

IDAHO MARYLAND INDUSTRIES INC
13103 Ventura Blvd
Studio City
Pres: George J Morton
VP, Finance: Vernon M John
VP, Marketing: Donald R Butterfield
Sec: John N Dicks
Treas: Wm J Baldwin
Dir Material: Ray Williams
BRUNSWICK & other mines, undergr, Au, WO_3
No Prod

INDUSTRIAL MINERALS & CHEMICAL CO
6th &Gilman Strs, Berkeley
Pres: W F Rhoton
VP: A L Hendrickson
Sec-Treas: A L Forbes
CLAY PIT, Sacramento Co
RANCHERIA MNG CLAIMS, Amador Co
MILLS, Berkeley and Florin, non metallic
(see Nev)

INYO SOIL SULFUR CO
c/o R E Kitching, 310 Pacific St, Bakersfield
MINE, Big Pine, Inyo Co, S

IRON AGE MINES CO
PO Box 128, Twenty Nine Palms
Gen Part: I W McManaman
IRON AGE MINE, 26 mi SE of Twenty Nine Palms, San Bernardino County, undergr, open pit, Fe
Mine Supt: Tom Norris
Prod: 100 tons
150-TON MILL, at mine
Mill Frm: J H Munsey
SNOWFLAKE MINE, 22 mi SE of Twenty Nine Palms, undergr, open pit, Fe
Prod: 100 tons
Mine Supt: Tom Norris

JACKMAN, PORTER L & BIANCHINI, BOB
Rt 1, Box 161B, San Luis Obispo
JOHN RANCH (BARNEBURG) MINE, Paso Robles, Mn

JEFFERSON LAKE SULPHUR CO
1408 Whitney Bldg, New Orleans 12, La
Pres: Eugene H Walet, Jr
VP: Harvey A Wilson
VP-Sec: Charles J Ferry
VP-Treas: L L Lassalle
Purch Agt: Carl McElrath
VOORHEES MINE, Copperopolis Calaveras Co, asbestos
(see La, Tex)

JOHNS-MANVILLE PRODUCTS CORP
22 E 40th St, New York, N Y
Pres: C B Burnett
VP: K W Huffine
Sec: H M Ball
Treas: J M Shackleford
Purch Agt: D H Lyons
CELITE DIVN, Lompoc, surface diatomite
Plant Mgr: O B Westmon
Asst Mgr: G G Schuknecht
Plant Eng: C A Carlson
Geol: E J Lommes
Quarry & Mines Supt: C W Sphar
Gen Frm: O C Benedict
Maint Mine Supt: E W Hodges
MILL, at mine, air separation
Mill Supt: G W Porter
(see Colo, N Y, N Mex)

JOLLY JACK URANIUM CO
703 Crescent Avenue
San Francisco 10
Pres: Richard H Hall
VP: Vernon R Aiken
Sec-Treas: Nathan Sternsher
(see Utah)

KAISER RE-FRACTORIES AND CHEM DIVN KAISER ALUMINUM & CHEMICAL CORP
300 Lakeside Dr, Oakland
Chmn & Founder: Henry J Kaiser
Pres: D A Rhoades
VP& Gen Mgr: F M Cashin
Sec: W P B Marks
Treas: R A Clayton
Purch Agt: D S Gregg
NATIVIDAD DOLOMITE QUARRY
Natividad, open pit, dolomite
Oper Mgr: J F Knight
Works Mgr: W T Burns
Plant Supt: Ivan Hall
Geol: E A Hassen
Div Eng: J E Wintere
300,000-TON (Yrly) HEAVY MED-MILL, 5 mi N E of Salinas

KAISER STEEL CORP
Kaiser Center, 300 Lakeside Dr, Oakland 12
Fndr & Chmn of Bd: Henry J Kaiser
Chmn of Bd: Edgar F Kaiser
V Chmn of Bd: E E Treyether, Jr
Pres: Jack L Ashby
Exec VP: C F Borden
VP & Treas: Atwood Austin
Gen Purch Agt: G W Kelly
EAGLE MOUNTAIN MINE, Box 158, Eagle Mountain, surface, Fe
Mgr: M J Hughes
Office Mgr: G R Riser
Geol: R W Brummett
Ch Eng: C E Davis
Maint Supt: C A Scott
Railroad Supt: V A Fischer
Benefication Supt: C W Reno
Gen Pit Frm: W A Horton
Prod: 7,000 tons
15,000 TON-HEAV-MED-JIG MILL, at mine
Gen Frm:Benefic: C W Reno
Ore Dressing Eng: R C Forbes
BLAST FURNACE

KATE HARDY MNG CO
Box 748, Grass Valley
Pres: Harold Hawn
KATE HARDY MINE, Sierra Co, Au, Ag

KENNEDY MINERALS CO, INC
2550 E Olympic Blvd
Los Angeles 23
Pres: John J Kennedy
VP: A F Escober
Sec: Paul H Wayte
Treas: Fred L Clover
DEATH VALLEY TALC MINE Inyo Co, talc
IBEX MINE, Inyo Co, Clay

KERN COUNTY LAND COMPANY
600 California St
San Francisco 8,
Pres: Dwight M Cochran
Exec-VP, Oil & Minerals: H L Reid
Mgr, Minerals Dept: Wm T Griswold
Area Geol: Kenneth M Reim
Box 380, Bakersfield
(see Ariz, Idaho, Utah)

KERN URAMIUM CO
PO Box 163, Rio Vista
LITTLE SPARKLER MINE, Mineral Hot Spring, Kern Co, U_3O_8

KILLEBREW, W L
510 N 4th St, Blythe
TADPOLE MINE, Palo Verde, Mn

KLAU MINE, INC
57 Post St #711
San Francisco
Pres: M B Gould
Sec-Treas: B A Gould
KLAU MINE, Paso Robles, undergr, Hg
HELEN MINE, Middletown, undergr, Hg
VIRGILIA MINE, Quincy, undergr, Au
Mgr: H W Gould & Co
No Prod

KNEPPER, L W
Box 87, Indrio
SANTA RITA, SANTA ANITA, SAN CARLOS MINES, New Indrio Dist
San Benito & Fresno Counties, surface Hg
EL CAJON MINE, Panoche Dist, San Benito County, surface, Hg
NORTH STAR MINE, San Benito Co, Surface, Hg
Prod: 20 tons

KRITIKOS, W T
5578 Harbord Dr Oakland 18
OAT HILL MINE, 9 mi SE of Middletown, Napa Co, open pit, Hg
Mine Supt: H C Ingle, Jr
Prod: 10 tons hourly
200-TON OATHILL MILL, at mine, Hg
Mill Supt: H C Ingle, Jr
RETORT SMELTER

LANDSON MNG CO
PO Box 655, Maricopa
MINE, Maricopa, gypsum

LINCOLN CLAY PROD CO
Box 367, Lincoln
Pres: M J Dillman, Jr
VP: K S Brown
Sec-Treas & Purch Agt: A S Gulliford
MINE, 1 1/2 mi N of Lincoln, open pit, fireclay
Mine Frm: C O Pardee
Prod: 450 tons
BU-TON MILL

LORETTO COPPER MNG CO
PO Box 747, Big Pine
Mgr: William R Noack, 5173 Earl Drive, La Canada
MINE

LUCK MNG CO
215 Market St
San Francisco 5
Mgr: J F Hutchins
(see N Mex)

LUCY GRAY GOLD MNG CO, INC
3109 Juana Vista Dr
Las Vegas, Nev
Pres: James E Martin
VP & Sec-Treas: Ethel F Martin
Dir-Resident: Louise McGuire
LUCY GRAY MINE, Sunset Dist, Lucy Gray Range, mine address: Lyon-Desert UPRR Sta, c/o Lu Peters, Nipton, Au Ag, Pb, quarts crystals, uranium prospect
Under devel

MACCO CORP
7844 E Rosecrans, Paramount
Pres: F E Cornwell
VP: John M Robinson
Purch Agt: Neil Giebler
BARITE KING & BARITE QUEEN MINES, Box "O", Rosamond, Nine Mile Canyon, undergr & open pit, barium sulfate
Gen Mgr: John M Robinson
Gen Supt: Harry Parker
Asst Mine Supt: Clem Thompson
Prod: 100 tons
200-TON GRAV MILL, Nine Mile Canyon (Hwy 395), Rosamond
Mill Supt: Harry Parker

MACELA, CARL & WERTA, INTO
PO Box 476, Garberville
QUEENS PEAK MINE, Humboldt Co, Mn

MARMO DIAMONTE QUARRIES
Box 384, Yucca Valley
Pres: Art Kurth
VP: Ben Gage
Sec: Elmer Schmachi
MARMO DIAMONTE & POVERTY GULCH QUARRIES, Mound Spring Valley, Yucca Valley, open pit, marble, stone, Au
Gen Mgr: Art Kurth
Geol: John James Eidel
Geol & Eng: Geodynamics, Inc
PO Box 1258, 1543 3rd St, Santa Monica
Prod: 10-50 tons

MASONIC MINES ASSOC (A TRUST)
750 - 12th St, Oakland 7
Pres: Violet M Heinemeyer
VP: Elton P Heinemeyer
CHEMUNG MINE, Mono Co, PO Box 141, Bridgeport, undergr, Au, Ag
Gen Mgr: E P Heinemeyer
Under devel
25-TON CYANIDE MILL, at mine
Mill Supt: E P Heinemeyer

MC KINNEY, G E
Star Route, Box 30, Livermore
MINE, Red Mountain, Santa Clara Co, magnesite
BUCKEYE & #23 MINES, Stanislaus Co, Mn

MC PHAILL GYPSUM CO
PO Box 927, Visalia
MINE, Avenal, Kings Co, gypsum

MERCIE MNG & HOLDING CO
5035 W Oak St, Visalia
Pres & Purch Agt: Capt Carl J Buehler
VP: Irvin C Silverberg
Sec-Treas: Earl Oglevie
(see Nev)

MILLS, CHARLES K
Gen Del, Palo Verde
CHIPMUNK and MARY ELLEN MINES, Palo Verde, Mn

MILLS, CHRIS
c/o Bagley Store, Mariposa
RED BANKS MINE, Coulterville, lode, Au

MINERAL MATERIALS CO
1145 Westminster Ave
Alhambra
Gen Mgr: C W Dunton
ATLAS SILICA MINE, PO Box 394, Oro Grande, surface, silica quartzite
Gen Supt: Roy Hill
Mine Frm: Lloyd Bailes
Ch Eng: M W Redhead
Prod: 200 tons
800-TON MILL, Oro Grande, jaw crusher and 7 rolls
(see Nev)

MINERALS EXPLOIT CO
510 N Fourth St, Blythe
JET BLACK MINE, Palo Verde, Mn

MINERALS PROD CO OF CALIF
1200 Bayshore Hwy
Burlingame
Pres: George N Keyston Jr
VP: H H Van Aken
Sec-Treas: David H Keyston
(see Colo)

MITTIE & PERON
Star Route, Mariposa
SPECIMEN MINE, Bagby, lode, Au

MOBLEY, HARRY
Rt 1 Box 174, San Martin
NEW ALMADEN MINE, Almaden, Hg

MOLYBDENUM CORP OF AMERICA
375 Park Ave, New York, NY
Pres: Marx Hirsh
VP: E A Lucas
Treas: Wm Kuntz
Gen Mgr: H D Bailey
Asst Gen Mgr: Russell Wood
Met: H S Woodward
MT PASS MINE, Nipton, 60 mi SW of Las Vegas, Nev, on US 91 open pit, rare earth metals
Mine Frm: Ira Proud
150-TON FLOT MILL
Mill Supt: G H Lee
(see Colo, N Mex, NY, Pa)

MONOLITH PORTLAND CEMENT CO
Box 65947, Glassell Sta, Los Angeles 65
VP: Hugh D McBride

GOLDSPAR MINE, 25 mi SE of Beatty, open pit, CaF_2
Supt: Charles Hoffman, PO Box 336, Beatty, Nev
(see Nev)

MORNING STAR MINES CO
PO Box 501, Wheatland
Pres: Norman A Lamb
VP: R S Bradford
Sec-Treas: J P Lamb
Purch Agt: Norman A Lamb
MORNING STAR MINE, PO Box 848, Pioneer, undrgr, Au
Gen Mgr: N A Lamb
Mine Supt: R S Bradford
No Prod
20-TON FLOTATION MILL, Pioneer
Mill Supt: Behrend Doscher
Assayer: J P Lamb

MOUNTAIN COPPER CO OF CALIF
Matheson Station, Redding
Chmn of Bd: L T Kett
Pres: C W McClung
Sec: Dudley Miller
Treas: K I Dasey
Purch Agt: S D Dodds
IRON MOUNTAIN MINE, open pit, iron pyrite
Gen Mgr: C W McClung
Elec Eng & Mast Mech: Ben Jackling
Chief Eng: D K Winsor
Gen Surf Frm: F Serpa
Mine Frm: W H Calhoun
Mine Eng: R J J Lampson, Jr
Prod: 500 tons
600-TON CRUSHING PLANT

MUGWUMP MNG CO, INC
259 Monterey Rd, So Pasadena
Pres: Virginia A Vivian
VP: Dr Stevan T Mayes
Sec-Treas: Fred W Rollyson
Supt: Cecil T Vivian
MUGWUMP, LIVE YANKEE, YOUNG AMERICA, EXCHANGE GOLD BUG MINES, Forest City via Alleghany PO, Sierra Co, undergr, Au
Under Devel

NAT'L LEAD CO, BAROID DIV
PO Box 1675, Houston 1, Texas
HECTOR MINE & PLANT, Newberry, undergr, bentonite
Supt: Jack Hereford
MERCED MILL, Merced, dry grinding of barytes
Mill Supt: Les Bunch
(see Ark, Colo, La, Mo, Mont, Nev, NY, Tenn, Tex, Wyo)

NATOMAS COMPANY
607 Forum Bldg
Sacramento
Pres & Gen Mgr: R G Smith
VP: Mortimer Fleishhacker, Jr
VP & Sec-Treas: Chandler Ide
Asst Sec-Treas: Wanda Durkee
Chmn of Bd: R K Davies
Mgr Gold Dredging Dept: Cyril Thomas
PLACER MINE, Natoma, 20 mi E of Sacramento, Au
Prod: 12,000 cu yd
(see Colo)

NAVAJO MINERAL FUND INC
223 S Fremont St, Las Vegas Nev
Pres-Purch Agt: J J Satin
VP: Phillip T Asaro
Sec-Treas: Rose Satin
LUCKY JOE MINE, Iron Mt Rd, Eagle Mt mng dist, Riverside Co, Calif, open pit, Fe
Gen Mgr: J Satin
Geol-Met-Mine Supt: R Douglas
Prod: 500 tons
Under devel
500-TON-HEAV-MED MILL, Iron Mt Rd

NEW IDRIA MNG & CHEM CO
Idria
Pres: C Hyde Lewis
VP-Sec: Arthur W Goring
Treas: E A Fabiani
QUICKSILVER DIVISION, Idria
San Benito Co, undergr, Hg
Div Mgr: Wesley Shadduck
Geol: Robert K Linn
Mine Frm: Victor Sola
MILL, at mine
STRAWBERRY TUNGSTEN DIVISION
1950 Tyler St, Fresno, undergr, WO_3
Div Mgr: Milan C Richardson
Office Mgr: Palmer Deines
(see Colo)

NEW VERDE MINES CO
PO Box 1027, Grass Valley
BROWNS VALLEY GRP, Yuba Co, Au, Ag
EMPIRE NORTH STAR GRP, Nevada Co, Au

NIKOLAUS & NIKOLAUS CO
Big Pine
MINE, Big Pine, Inyo Co, S

NORRIS, THOMAS D ET AL
PO Box 111, Keeler
SANTA ROSA MINE, Keeler, Inyo Co, Cu

NORTH WESTERN MNG CO
PO Box 826, Des Moines, Wash
Own: Alfred W Peeler
BOULDER GULCH GROUP, 8 mi W of Sawyers Bar, Siskiyou Co, placer, Au, Ag
Supt: A Everett Miller
Under devel
(see Wash)

OIL BASE, INC
130 Oris St, Compton
LEVIATHAN MINE, Barstow, San Bernardino Co, Ba

OLSON, ROY S
1178 Walnut Ave, Redding
OSCAR DAVIS PROPERTY, Redding, dragline dredge, Au

ONTOP MINE
Meadow Valley, via Quincy
Own: H E Fowler
MINE, 3 1/2 mi S of Bucks Lake, undergr, Au, Ag
Under devel
6-TON GRAV QUARTZ MILL

ORIGINAL 16 to 1 MINE, INC
235 Montgomery St
San Francisco 4
Pres-Gen Mgr: Wm M Maxfield
Sec-Treas: Jack Maxfield
VP: C A Bennett
ORIGINAL 16 to 1 MINE, Sierra Co, Au
Frm: W C Hart
150-TON CONC & AMAL PLANT
Mill Frm: J B Hunlday

OWENS-ILLINOIS
PO Box 1035, Toledo, Ohio
MINE, Pacific Grove, feldspar

PACIFIC CLAY PRODUCTS
1255 West Fourth St, Los Angeles
(PO Box 2178 Terminal Annex)
Pres & Ch Exec Off: John D Fredericks
VP & Gen Mgr: Paul H Wendt
Exec VP: Kenneth Barrette
VP, Sales: John C Culhane
VP & Plant Mgr: John K Seitz
Sec-Treas: Walter M Colley
Dir of Purch: Marshall L Morgan
ALBERHILL & CAMANCHE MINES, open pit, clay, silica
Supt: J Harvey Gardner
FLOT MILL, Camanche
Supt: E V Hickman

PACIFIC FLUORITE CO
Valley Wells, via Nipton
MINE, Nipton, San Bernardino Co, fluorspar

PACIFIC INDUSTRIES INC
Box 880, San Jose
Pres: Donald D Smith
VP: John R Plant
Sec-Treas: Ronald Bailey
Purch Agt: Nick Eliskovitch
CENTRAL EUREKA MINE
Sutter Cr, undergr, surface, Au
Gen Mgr: Nick Eliskovitch
Geol: Robert E McDonald
No Prod
(see Colo)

PACIFIC INSTITUTE OF EARTH SCIENCES
PO Box 31427, Los Angeles 31
Pres: H A Shiffer
Sec: A E Beaumont
Treas: I M Beebe
Dean, Coll of Mines: Dr Clarence Lamb
KERN FOURTEEN MINE
Tehachapi Mts, Kern Co, undergr, WO_3
Gen Supt: Bill Weisgerber
Geol: Dr H A Shiffer No Prod
UPPER PARADISE #2, Paradise Mts, Coyote Dry Lake Area, Box 713, Barstow, WO_3
ilmenite, undergr
Gen Mgr: Dr Clarence Lamb
Geol: Dr H A Shiffer
Met: H Ellis
No Prod
(see H A Shiffer, Calif; Upper Paradise Mines, Calif)

PACIFIC MINERAL PRODUCTS CO
337 - 10th St, PO Box 1546, Richmond
Pres: Charles Renwick Jr
Supt: Curt Wilson
SHINGLE SPRINGS MINE, Shingle Springs, soapstone
MILL, Willits

PALO ALTO MNG CORP
14900 Coleman Rd
San Jose 24
Pres: Fred H Smith
VP: Geo E Carlson
Sec-Treas: Mrs Veta H Latham
GUADALUPE & CEDAR MOUNTAIN MINES, San Jose
Alameda Co, Cr_2O_3, undergr, open pit
Gen Mgr: George E Carlson
Mine Supt: John Gargan
No Prod
50-TON GRAV MILL, at Guadalupe mine, HgS

PANCO MNG CO
33 Karen Lane, Walnut Cr
Own: H O Sherwood
RAY SCHULTZ RANCH MINE
Petaluma, Cheleno Valley Dist, undergr, Hg
Prod: 300 lbs retort

PARAMOUNT MNG & DEVELOPMENT CORP
Arden, Nevada
Pres: C H Troxell
BESSMER IRON MINE, Camp Rock Valley, San Bernardino Co, open pit, Fe
Mine Eng: Ed Morris
On "iron reserve" status
GOOD HOPE LODE, Yuba Co, undergr, Au
Chief Eng & Res Supt: Ed Morris
MILL, under construction
SIERRA SCIENTIFIC #1, Fresno Co, undergr, BeO
Geol, Eng & Sup: H A Shiffer Associates
Chief Eng: H A Shiffer
(see Nev)

PARK CITY CONS MINES CO
438 S Main St, Salt Lake City
Pres & Treas: Carl Stehle
VP: J L Chadwick
Sec: H Corkey, Jr
SAN MARTIN ASBESTOS MINE, Monterey Co, open pit, asbestos
Gen Mgr: George Gaul
Geol: F T Stehle
Under devel
(see Colo, Utah)

PHILLIPS, H J
1361 Chase Ave, El Cajon
PHILLIPS MINE, 3 mi SE of El Cajon, undergr, Au, Cu, Pb
AMAL-GRAV MILL
Under devel

PIGGOTT PROJECTS
1057 Howard St, San Francisco 3
Own: H B Piggott
ELECTROLYTIC, RETORT & FUMING SMELTER, Cowell, Ag

PIMA MNG CO
523 W 6th St, Los Angeles 14
Pres: H T Mudd
VP: A R Thomas
A Christensen, H S Nye
VP & Gen Mgr: P W Allen
Sec: D Evans
Treas: L W Smith
(see Ariz)

PIONEER MNG CO
1908 W Holman, Alhambra
LOGAN MINE, Newberry, San Bernardino Co, Mn

POWHATAN MNG CO
6721 Windsor Mill Rd
Baltimore, Md
Pres & Gen Mgr: F A Mett
VP & Sec: C Silver
Treas: E L Farley
Off Mgr: F E Mett

WESTERN HEAVY

COLORADO

MINE, U-Co

SPINDRICK MINE, Fremont

BINDER, E V

SHASTA COUNTY MINE, open pit, asbestos
Gen Mgr: J C Kempvanee
No Prod
(see Md)

PREMIER LIMESTONE PRODUCTS
5603 Atlantic Blvd, Maywood
Pres: Glenn R Watson
VP: Donald M Gustafson
SHEEP CREEK DEPOSIT, vicinity of Wrightwood, San Bernardino Co, open pit, limestone products
Gen Mgr: Glen W Smith
Gen Supt: Carl Partin
Mine Supt: George Hendricks
Prod: 300 tons

PREMIER MARBLE PRODUCTS
5603 Atlantic Blvd, Maywood
Pres: Glenn R Watson
VP: Donald M Gustafson
INYO MARBLE MINE, PO Box 244, Lone Pine, undergr, marble
Gen Mgr: Guy Weatherly
Mine Supt: Ray Sonke
No Prod
200-TON MILL, near Lone Pine

PROVIDENCE TUOLUMNE GOLD MINES, LTD
1646 Union St
San Francisco 23
Pres: C C Celestre
Sec: F Grotyohn
COPPER BLUFF MINE, Humboldt Co, undergr, Cu, Au, Zn
Gen Mgr: J MacGinnies
Mine Supt: W M Graham
Prod: 50 tons
150-TON FLOT MILL, 2 mi N of Hoopa
Mill Supt: Ralph Hutchins
Asst Mill Supt: Lorance McLenen

QUAIL MINE
PO Box 64, San Martin
Pres: H E Moerlien
Caretaker: Stanley W Pratt
QUAIL MINE, Coulterville, Au
No Prod
60-TON FLOTATION MILL, at mine

RED LEDGE MINES
4704 - 69th St, Sacramento
RED LEDGE MINE, Washington, Nevada Co, lode, Au

RINGWALT, GEORGE
Box 1111, Blythe
BRIGHT STAR MINE, Palo Verde, Mn

ROSAMOND SILICA & FELDSPAR MINE
PO Box 445, Rosamond, Kern Co
Own: N W Sweetser
ROSAMOND SILICA & FELDSPAR MINE, undergr, silica, feldspar
Gen Mgr: N W Sweetser
Prod: 10 tons
20-TON CRUSHING PLANT, at mine

ROYER, FRANK W
Red Mt
KELLY MINE, San Bernardino Co, Au, Ag
No Prod

RUBY & CITY OF SIX MINES CO
PO Box 903, Alleghany
Pres & Gen Mgr: Roland De Grio
VP-Sec: Wren Frederking
MINE, Alleghany, undergr, placer, Au, Quartz
Mech Eng & Asst Mine Supt: Harold Darewit
Mine Eng: Thomas Taylor
Under devel

S P LODE MINE
1361 Chase Ave, El Cajon
SP MINE, 7 mi So of Octillo in Davies Valley, Imperial Co, (Octillo is on Hwy 80), undergr open pit WO_3 (Scheelite) 3 acre outcrop
Under devel

SACRED BUTTES CORP
c/o Max E Larson
3781 West Pacific Ave, Sacramento
MINE

SADDLE MT MINES
c/o J Noviack, Box 624, Alturas
MINE

SALMON RIVER MINES CO
Callahan
Pres & Gen Mgr: E C Latchem
VP: L J Harter
Sec-Treas, Purch Agt: V W Peterson
TRAIL CREEK MINE, Au, undergr
50-TON FLOT MILL
No Prod

SAN GABRIEL VALLEY PLACERS
1237 S Greenwood Ave, Montebello
Own: Robert A Riggs
MINE, 2 mi W of Azusa, placer, Au, Ag
GRAV MILL

SANTA ANITA GROWERS CO
3910 Redondo Beach Blvd, Torrance
CRATER CHEMICAL MINE, Amboy open pit, gypsite agricultural
Prod: 25 tons daily
(Leased from Crater Chemical Corp, Los Angeles 28, Calif)

SCHOLZ, E A & CAZIER, J H
1503 Black Mtn Rd, Hillsborough
(see Ariz)

SCHWARTZ, A O
Fort Jones
MISSISSIPPI MINE, Seiad Valley Siskiyou Co, dragline dredge, Au

SCOTT, WALTER D
Star Rt, Ripley
TADPOLE MINE, Palo Verde, Mn

SELF, CECIL & AHO, GEORGE
PO Box 584, Lone Pine
EMLEY MINE, Kesler, Inyo Co, Ag

SENTINEL MNG CORP
PO Box 658, Lucerne Valley
Pres: George W Veale
VP: Elick Bowler, A W Bowler
Sec: George W Veale, Jr
Treas: Wilbur C Veale
SENTINEL MINE, 8 mi S of Lucerne Valley PO, open pit, dolomite, limestone
Gen Mgr: Wilbur C Veale
Cons Geol: George Schroter
Mech Eng: Harry H Pike
Prod: 200 tons

SEQUOIA MNG CO INC
218 Palm Ave, Imperial Beach
Pres: J G Kromschroeder
VP: Carl R Bandelin
Sec-Treas: David I Epstein
ALLIANCE MINE, Darwin, undergr undergr, steatite talc & luva talc
Gen Mgr: James M Muir Jr
Under devel

SHASTA MINERALS & CHEM CO
1406 Walker Bank Bldg, Salt Lake City, Utah
Pres: K L Stoker
VP: Harper Hunsaker
Sec: Nancy Hardman
Treas & Purch Agt: Reed L Reeve
WEST SHASTA COPPER-ZINC DIST MINE, Box 857, Redding, Shasta Co, undergr, Cu, Zn, S Fe, Au, Ag
Gen Mgr: W J Walker
Geol: J B Imswiler
Under devel

H A SHIFFER ASSOCIATES MNG SYNDICATE
PO Box 31427, Los Angeles 22
Pres: Dr H A Shiffer
VP: Frank G Tooley
Sec-Treas: A E Beaumont
Purch Agt: Walter Wernecke
VIRGINIA & POSO MINE, Poso Creek, Pine Mt Mng Dist, Kern Co, placer, black sand, Cb, Ti, Zr, Au
Geol: H A Shiffer
No Prod
FLOT MILL, at mine
(see Upper Paradise Mines, Calif, & Pacific Institute, Calif)

H A SHIFFER ASSOCIATES SCIENTIFIC FOUND, INC
108 N 3rd St, Las Vegas, Nevada
Pres: Dr H A Shiffer
VP: R James
Sec: A E Beaumont
Treas: Ann Wishnoff
Purch Agt: Walter Wernecke
Nevada Counsel: Robert Cohen
SIERRA SCIENTIFIC LODE NO 2, Horseshoe Bend, Kings Canyon Natl Forest, undergr, Au, Beryl Zr
Gen Mgr: F C Tooley
Gen Supt: J Stark
Geol: Dr Shiffer, W Weisgerber
Mine Eng: Dr L Cionl
LABORATORY, Buckeye Flat
(Jt Ownship of SHIFFER SCIENTIFIC FOUND PACIFIC INST & has 1/3 share in ASSOCIATES MINING SERVICES)

SILVER LAKE MNG & MLG INC
12707 Matteson Ave, Los Angeles 66
Pres: William R Long
VP: William Fritzsche
Sec-Treas: Mitchell Kovaleski
SILVER HILL MINE, Baker, San Bernardino Co, open pit, Ag, Pb
Gen Mgr: William R Long
Geol & Mine Supt: Gaylord Humberger
Prod: 50 tons
50-TON FLOT-GRAV MILL, Silver Lake
SMELTER, BLAST FURNACE, Silver Lake

SISKON CORP
Box 889, Reno, Nev
Pres: H B Chessher Sr
VP: E J Schrader & H B Chessher, Jr
Sec: J E Chessher
Asst Sec & Treas: A L Chadek
SISKON MINE, Box 435, Happy Camp, open pit, Au, Ag
Gen Supt-VP: H B Chessher Jr
Pit Frm: C W Cousineau
Prod: 400 tons
Mill Supt: A L McFarland
Main Frm: Ralph W Moody
(see Nev)

SONOMA QUICKSILVER MINES INC
Box 226, Guerneville
Pres: S R Smith
VP: J E R Wood
Sec-Treas: J W Cook
MT JACKSON MINE, Guerneville undergr, Hg
Gen Mgr & Supt, G F Reed
Geol: F H Rederick
Mine Supt: Graydon Weaver
Mine Frm: R G Walker
Mech Eng: J L Galli
Prod: 100 tons
100-TON MILL, at mine, rotary furnace 7 condensers
Assay: J F Hill

SPAULDING, L B
Box 15, Ramona
LITTLE THREE MINE, Ramona Pegmatite minerals

STARR GYPSUM CO
516 Sperry St, Bakersfield
MINE, gypsum

STAUFFER CHEMICAL CO, WEST END CHEMICAL DIV
1958 Webster St, Oakland 12
MINE, Westend, San Bernardino Co, borates

STORM-JADE MOUNTAIN MINE (STORM SULPHIDE MNG CLAIMS)
c/o Barry Storm, PO Box 74, Inyokern
Own-Op: Barry Storm
STORM-JADE MOUNTAIN MINE, 8 mi E of Old Dale Jct in Joshua Tree Natl Monument on Black Eagle Mine Rd, undergr & open pit, jades, jadeites
Prod: variable
Under devel

SUNSET AGRICULTURAL MINERALS
1629 S Union Ave, Bakersfield
MINE, Taft, gypsum

SUPERIOR GYPSUM CO
3911 Pierce Rd, Bakersfield
MINES, Bitterwater Cr, and Carrizo Plains, gypsum

SURCEASE MNG CO
5318 Callister Ave
Sacramento 19
Pres: Mrs Josephine A Hoefling
Sec-Treas: J B Gee
ATOLIA MINES, Box 27, Red Mountain, 3 1/2 mi S of Red Mountain on Hwy 395, surface, undergr, WO_3
No Prod

TEMBLOR GYPSUM CO
Carrizo Plains Star Rt, Box 80, Santa Margarita
MINE, Carrizo Plains, gypsum

TEX YOUNG MINES, INC
1000 S Bayshore Blvd, San Mateo
TOY YOUNG MINE, Lake Pillsbury, Lake Co, Mn

TIGHTNER MINES CO
Rm 549, 58 Sutter St, San Francisco
Pres: Robert E McCulloch
RED STAR GROUP, 1/2 mi N of Alleghany, undergr, Au, Ag
Under devel
50-TON GRAV MILL
(Leased to Endurance Mining Co)

TOTLAND BROS
Box 147, Leevining
Gen Mgr: G H Totland
BARBARA & BIG MUGGETT MINES, 12 mi NE of Leevining Au, Ag, Pb
BRIGHT STAR MINE, 8 mi W of Conway, undergr, Au, Ag, Pb, Bi
Under devel

TIMMONS, MYLES
PO Box 11, Crescent Mills
PLUMAS MINE, Crescent Mills, Plumas Co, Mn

TRI-PARTNER MNG CO
831 E Main St, Stockton
Pres: Clifton Finley
Sec-Treas & Gen Mgr: LeRoy A Washburn
SUNNY PLACER MINE, Buena Vista, placer, Zr, Ti, Au
No Prod
WONDER QUARTZ MINE, Groveland, undergr, Mn
Gen Mgr: LeRoy A Washburn
Asst Gen Mgr: Clifton Finley
Frm: Edmund Watters
ELLA MINE, Amador Co, Au, Ag

TUMCO MNG CORP
PO Box 142, Duarte
Pres: Dr Allen Bostwick
VP, A Tucker
Sec-Treas: A L Smith
VEGA PROPERTIES, Saline Valley, open pit, Cu, Au, Ag
Gen Mgr: A L Smith
Mine Supt & Geol: Cash Swinney
Geol: Lee Smith
Under devel
150-TON FLOTATION MILL

UNDERWOOD, HORACE V & CATHERINE L
156 Locust Ave, Hollister
BITTERWATER QUICKSILVER MINE, Panoche Dist, 42 1/2 mi SE of Hollister, 2 mi off county highway, Hg
No Prod
ANTELOPE COPPER MINE, 3 mi E of the Antelope School, San Benito Co, open pit, Cu
No Prod

UNION CARBIDE NUCLEAR CO (DIV OF UNION CARBIDE CORP)
Bishop
PINE CREEK MINE, 27 mi NW of Bishop, undergr, surface WO_3, Mo
Gen Mgr: H L McKinley
Purch Agt: C A Smith
Mine Supt: L A Wright
Mine Frm: E J Birch
Eng: D J Markl
1,000-TON FLOT MILL, Pine Creek
Supt: L E Sausa
Plant Met: J E Martinson
Mill Frm: H G Rouse
(see Colo, N Y, Nev, Utah, Wyo)

UNITED MERCURY PRODUCERS ASSOC
44 Mesa Court, Atherton
OLD ALMADEN GROUP, Santa Clara County, undergr, open pit, Hg
RETORT

U S BORAX AND CHEMICAL CORP PACIFIC COAST BORAX DIV
630 Shatto Place
Los Angeles 5
Pres: J M Geratley
Exec VP: Hugo Riemer
VP, Adm & Treas: R F Steel
VP, Tech Dpt: D S Taylor
VP, Prod: R T Edgar
VP, Mktg: J F Corkill
VP, 20 Mule Team Prod: D V Parker
Dir of Purch: J C Walker
Mgr, Land Dept: J P Smith
MINE, Boron, open pit, borate ores
Res Mgr: W J Diffley
Chf Mech Eng: D Fugit
Mine Supt: W H Wameley
Asst Mine Supt: R E Kendall
Chf Geol: S Muessig
Ch Chem: V Morgan
Gen Mine Frm: P A Conte
BORON REFINERY, Boron
Refin Supt: A Bela
Process Supt: T Cromwell
(see N Mex, NY)

U S GYPSUM CO
300 W Adams St, Chicago 6 Illinois
MIDLAND MINE, Midland, open quarry, gypsum
Works Mgr: W E Watkins
PLASTER CITY MINE, open quarry, gypsum
Works Mgr: R W Deneke
(see Colo, Conn, Ill, Ind, Iowa Mass, Mich, Mont, Ohio, Okla N Mex, NY, Tex, Utah, Va)

U S MINERALS INC
PO Box 503, S Endert Rd, Crescent City
Pres: Wm Ashmus
VP: Peter Karabetsos
U S MINERALS MINE, placer, Au, Pt
Gen Mgr: Edward Wosnick
Mine Frm: Dick Roethle
Under devel
MILL, S Endert Rd

UNIVERSAL SILVER CO
890 Market St, San Francisco
ALTOON A MINE, Trinity Center Hg

UPPER PARADISE MINES ASSOC INC
108 N 3rd St, Las Vegas, Nev
Pres: H A Shiffer
Sec: A E Beaumont
Purch Agt: W Wernecke
DAD THOMPSON MINE, DESERT HOLLY & SILVER DOLLAR CLAIMS (SEC 18 12 N 2 E SBB&M), undergr BeO, barite
VERONIC MINE, PO Box 713, Barstow, Sec 6, 12 N 2 E, Paradise Mts dist, San Bernardino Co, garnet
Geol: H A Shiffer
Geochemist: Steve Lamme
Assessment work only
(see Upper Paradise Mines Assoc Inc, Nev, and H A Shiffer Assoc & H A Shiffer Assoc Scientific Found, Calif & Nev)

UTAH CONSTRUCTION & MNG CO
550 California St
San Francisco 4
Pres: A D Christensen
Exec VP & Gen Mgr: E W Littlefield
Treas: O L Dykstra
Purch Agt: J B Hale
Mgr Mng Oper: A M Wilson
(see Utah, Wyo)

VALK, H L
Rt 3, Box 1360A, Oakdale
JUNIPER MINE, Tuolumne Co, U_3O_8
Under devel

VULTURE BONANZA MINE
712 E Broadway, Glendale
Pres: Anthony Fenninger
VP & Sec: M E Fenninger
Treas & Purch Agt: Monty Jones
(see Ariz)

WALLACE, R L & ELLISON, R H
PO Box 105, Willits
FOSTER MOUNTAIN MINE, Ukiah, Mn

WESTERN HEAVY MINERALS INC
1660 El Nido Way Way
Sacramento
Pres: M C Heaney
VP: J M Branigan
Sec: F McMullin
MINE, Placer County, placer, Au, Pt, zircon, rutile
Gen Mgr: M C Heaney
Geol: M C Heaney

WESTERN TALC CO
1901 E Slauson Ave
Los Angeles
Pres: F H Savell, Sr
VP: Malcolm Stewart
WESTERN MINES, operating on Snow Goose claim, 17 mi SE of Tecopa, San Bernardino County, talc
Mine Supt: Larry Lee
MILLS, LOS Angeles and Dunn, San Bernardino County
Capacity: 150 tons per day average

WILSON-ANDERSON OIL CO
14900 Coleman Rd,
San Jose 24
Pres: F H Smith
VP: Clarence Hall, John V Gargan
Sec-Treas: Ted Withers
Purch Agt: John V Gargan
Dir: Jack Edwards
GUADALUPE MINES, undergr, open pit, placer, cinnabar
Gen Mgr: Clarence Hall
Asst Gen Mgr: John V Gargan
Prod: 600 tons
600-TON GRAVITY & TROMMEL MILL, Santa Clara Co

WIND WHEEL MINE
Box 151, Columbia
Own: R O Greeves
MINE, undergr, Au, Ag
3 1/2 TON GRAV MILL, at mine
RETORT, at mine

WOLF CREEK MNG CO
Box 52, Clear Lake Highlands
MINE, Clear Lake Oaks, Lake Co, S

WYANDOTTE CHEMICAL CORP
1609 Biddle Ave, Wyandotte, Mich
MINE, Lompoc, Santa Barbara Co, diatomaceous earth
(see Mich, Miss)

YELLOW STAR MNG CO
Box 914, Jackson
YELLOW STAR MINE, undergr, Au, Ag
Gen Mgr: Chester W Decker
Under devel
30-TON FLOTATION & GRAVITY MILL under construction for own and local custom milling, Sec 5 T 6 N, R 13 E, West Point mng Dist

YRACABEL, VINCENT
PO Box 17, Middletown
OAT HILL MINE, Aetna Springs Hg

YUBA CONS INDUSTRIES INC
(YUBA CONS GOLD FIELDS DIV)
351 California St
San Francisco 4
Pres: John L McGara
VP, Mfg: E J Gorman
Sec: E K Allison
Treas: W J Holcombe
MINE, Star Bt, Marysville placer, Au, Sn

YUBA MNG CO
2051 Santa Clara Ave
Alameda
Pres: J J Farley
VP: A E Parker
Sec-Treas: Denby S Colfax
YELLOW JACKET MINE, PO Box 1, Kelsey, Eldorado Co undergr, Au, Ag
Gen Supt: Wilbur E Timm
Geol: S T Hilberg
Mech Eng: John E Brooks
Mine Frm: James J Hardy
Prod: 40 tons
10-TON FLOT-GRAV MILL, at mine
Mill Supt: G E Hiller
Asst Supt: James A Slater

COLORADO

A A A OIL & MINERALS
4925 Eliot St, Denver 21
Pres: Bruce M Ash
VP: Jack Perrigoue
BERYL MINING LODE, Larimer Co, Golden Gate Canyon, Golden; Park Co, open pit, BeO, mica feldspar, rare earths
Under devel

ACE TURNER URANIUM CORP
C H Jacobsen
Box 1001, Grand Junction
ECONOMY NO 1 MINE, Mesa U_3O_8

AJAX URANIUM CORP
1306 Cherokee St, Denver 4
Pres: T J Weaver
VP: H W Woodruff
Sec-Treas: Frances K Waggener
73 CLAIMS, San Miguel Co, U_3O_8
Geol: T J Weaver
Under devel

ALABAMA MINES
855 Lincoln, Denver
Pres: R G Stebbins
VP: B R Stebbins
ALABAMA MINE, SW of Idaho Springs, undergr, Au,
No Prod

ALBANO, CLAIR R
Box 522, Nucla
RAVEN MINE, Little Jip, Montrose Co, undergr, U_3O_8, V_2O_5

ALLIED CHEM CORP (GEN CHEM DIV)
40 Rector St, New York 6, or PO Box 70, Morriston, NJ (Mng Dpt)
Pres: F J French
VP: J S Brown
Purch Agt: J A Simpson
Mgr Mng Oper: Wilbert J Trepp
Asst Mgr Mng Oper: J R Pennington
Geol: Harry E Puttuck
BURLINGTON MINE, Jamestown Box 238, Boulder, undergr, CaF_2
Gen Supt & Met: Glen E Allen
Mast Mech: A G McGown
Mine Frm: Jack Mann
Prod: 150 tons per day
150-TON FLOT MILL, Valmont
Mill Frm: T J Hinshaw
Asst Met: G Everett Allen
(see NY, Va, NJ)

ALLISON ZAMRZLA & JOINER MINES INC
Gen Del, Dove Creek
Pres: Clyde Allison
VP & Purch Agt: James Zamrzla
Sec: Donald Allison
Treas: James Joiner
WINDSWEPT MINE, Gypsum Valley, undergr
Gen Mgr: Clyde Allison
Asst Gen Mgr & Supt: James Zamrzla
Geol & Mine Frm: Donald Allison
Eng: James Joiner
Prod: 12 tons

ALONGO, E J
Box 234, Naturita
DIANA MINE, undergr V_2O_5
Prod: 10 tons per day

ALTAMONT MNG & URANIUM INC
50 E 10th S, Bountiful, Utah
Pres: Geo Schultz
VP: Thomas Reese
Sec-Treas: Leo L Ralph
MIDAS MINE, near Gunnison
Under devel
Geol Mine Supt: R H T Dunsmore
(see Nev)

AMBASSADOR OIL CO
3101 Winthrop Ave
Ft Worth, Texas
MINERAL PARK NO4 MINE, Montrose Co, U_3O_8

AMENT & BERRY
Naturita
MINE, U_3O_8

AMERICAN EAGLE LEASING
Norwood
MINE, U_3O_8

AMERICAN GILSONITE CO
Municipal Airport, PO Box 15
Salt Lake City, Utah
Pres: E F Goodner
VP & Gen Mgr, Prod: R E Nelson
Sec-Treas: E H Owen
COKE PLANT-REFINERY, gilsonite
Supt: J L Boyce
Mgr: L P Morris
(see Utah)

AMERICAN LEDUC URANIUM
200 N 6th, Grand Junction
HENDERSON #1, ECONOMY #2 OUTLAW MESA, JEAN, OUTLAW #5 & #16, & PEACH #10 MINES, Outlaw Mesa area, Mesa Co, U_3O_8
PROPERTIES, Moffat Co, U_3O_8

AMERICAN METAL CLIMAX, INC, WESTERN EXPLORATION OFFICE
1845 Sherman St, Denver 3
Mgr: R J Wright
(see NY, U S Metals Ref Co, NJ; and Southwest Potash Corp, N Mex & NY)

AMERICAN SMELTING & REFINING CO
495 E 51st Ave, Denver 16
Mgr: J Paul Harrison
GLOBE PLANT, Denver,
Supt: W L Miles, Jr
Asst Supt: Max Coates
Safety Insp: J J Ryan
(see Ariz, Calif, Idaho, Ill, Md, Mont, Nebr, N J, N Mex, N Y, Texas, Utah, Wash,

AMERICAN WESTERN METALS CO
127 Montgomery St, #602
San Francisco, Calif
DEPRESSION 2 & 3 MINES, Mesa Co, U_3O_8

ANDRESS, CLYDE & ASSOC
Placerville
PAYROCK MINE, Mesa Co, U_3O_8, V_2O_5

ANDREWS, K M & D K
Box 67, Nucla
JUPITER MINE, Gunnison Co U_3O_8, Cu
Under devel
PRINCESS MINE, Montrose Co, U_3O_8, V_2O_5

ANSCHUTZ DRILLING CO, INC
1411 Mile High Center Bldg, Denver
Pres: A M Alloway
VP: J H Casier
AMERICAN EAGLE MINE, Gypsum Valley, undergr, U_3O_8, V_2O_5
Mgr Mng: J H Casier
Geol: Louis A Gas
Mine Supt: Lowell Thompson
Prod: 15 tons
(see Utah, Wyo)

ARGO MNG CO
Box 1697, Grand Junction
LOST DUTCHMAN MINE, Beaver Mesa, Mesa Co, undergr, U_3O_8, V_2O_5
Gen Mgr: Lyle F Campbell
Mine Frm: Willis M Rash
Prod: 70 tons

ARBOGAST, H L
Rt 4, Grand Junction
U_3O_8 Prod

ARGYLE MNG & MLG CO
2657 S Dexter St, Denver 22
Pres: J Cameron Grant
VP: John W Geske
Sec-Treas: Alfred O Brehmer
PRIDE, OSCEOLA & HEMATITE MINES, Silverton, San Juan Co, Pb, Zn, Cu, Ag, Au, hematite, undergr
Gen Mgr: J Cameron Grant
100-TON MILL, Howardsville
Mill Supt: Aldo Bonavida

ARKO, LOUIS
Box 726, Canon City
SPIKEBUCK MINE, Fremont Co, pegmatites
Under devel

ASCENSION MNG CO
404 E 5th, Box 47, Leadville
OLLIE REED, TENDERFOOT & ASCENSION #1 & 2 MINES, undergr, Au, Ag, Pb, BeO
Gen Mgr: George Peschel
Under devel

ATHEY, C N
Naturita
AZTEC, BLACK TOM, OPERA BOX MINES, west of Naturit undergr, U_3O_8, V_2O_5
(Leased from Union Carbide Nuclear Co)

ATLAS MNG & MFG CO
409 Main St, Delta
MINE, Delta Co, Fe, S
Under devel

AURA LEE ENGINEERING CO
PO Box 1678, Denver 1
Pres: E S Boase
VP: J T Collins
Sec-Treas: R J Bosworth
Purch Agt: Geo Horton
MINE, PO Box 385, Breckenridge, placer, Au, Ag, Cb-Ta
Gen Mgr & Geol: J T Collins
Gen Supt: H Fredericks
Mine Frm: R Dye
Prod: 200 cubic yds per hour
1600-TON GRAVITY MILL, Breckenridge

B E C MNG CO
Box 371, Paradox
VALLEY VIEW 1 & 2 MINES, U_3O_8

DELBERT W BARKER
PO Box 263, Nucla
MINE, U_3O_8

BARLOW, WILLIAM S
Dove Creek
MINE, San Juan Co, Utah U_3O_8
(see Utah)

BEAL & ASSOC
c/o Robert W Beal, Green Mt Falls
MINE, CaF_2
Under devel

BEAVER MESA URANIUM INC
PO Box 567, Grand Junction
Pres: Alan M Simpson
VP: Ben H Simpson
Sec-Treas: Mark Holloway
RAJAH-CHEROKEE-MARK II MINES, Gateway mng dist, undergr, U_3O_8, V_2O_5
Gen Mgr: Alan M Simpson
Mine Supt: Henry Lehr
Prod: 100 tons

BEERS, SIDNEY J
Naturita
PEGGY 1 & 2, PEGGY & RUSTY NO 5 MINES, U_3O_8

BENSON, BENSON & TIMMERMAN
Telluride
GOLD KING MINE
Gen Mgr: Chas Benson
100-TO GRAVITY MILL, at mine
Mill Supt: Chas Benson
Asst Mill Supt: Keith Benson

BENSON MNG & LEASING
4233 E North St, Tucson, Ariz
CONTINENTAL CHIEF MINE, 9 mi SE of Leadville, undergr
Ag, Pb, Zn, Au
Under devel
(see Ariz)

ERNEST BERRY
Naturita
MINE, U_3O_8

BERYL ORES CO
Arvada
Pres & Purch Agt: Michael D Lyons
Sec-Treas: P Marchulones
MICA GRINDER, Jefferson Co, open pit, beryl, mica
MICA GRINDING & SINTERING PLANT, Arvada
Prod: 4,000 lbs of BeO yrly

BINDER, F V
Naturita
CLUB SANDWICH & NUCLA MINES, Montrose Co, U_3O_8

BLACK EAGLE MNG CO
Box 717, Idaho Springs
BLACK EAGLE, Clear Cr, Pb Zn
No Prod

BLACK GIRL MINES CO
271 N Monterey Rd
Palm Springs, Calif
VP: J M McFadden
BLACK GIRL MINE, Ouray, undergr, Ag, Cu, Pb, Au
RED MT MINE, Red Mt, undergr, Ag, Cu, Pb, Au
Gen Mgr: J M McFadden
Geol: Dr C M Shaw
No Prod
(see Calif)

BOLLES BROTHERS
1415 N 15th St, Grand Junction
DEPRESSION NO 5, Flat Top, U_3O_8, V_2O_5

BOOTSTRAP, INC
1529 York St, Denver 6
Pres: Cecil Weston
VP: C I Musick
Sec: J R Strickland
CHIPMUNK MINE, Howard, open-pit, Cu, Au, Pb, Zn
Under devel

BROWN MINES
PO Box 243, Montrose
MINE, U_3O_8

BUCKSKIN JOE MINES, LTD
Alma
Gen Mgr: C W Jordan
PHILLIPS MINE, undergr, Au Ag, Cu, Pb, Zn, Fe
No Prod

PHIL BUNKER MNG CO
PO Box 277, Nucla
MINE, U_3O_8

BURRELL, DOROTHY Meeker
UTE MINE NO 3, U_3O_8
Under devel

C Y A C MNG & DEVEL CO, INC
Box 631, Salida
CYAC MINE, Antero Mtn, beryl
Under devel

CADWELL MNG CO
c/o Vernon L Phillips
2295 Cody St, Denver
Pres: R E Snow
VP: Vernon L Phillips
Sec-Treas: Frank L Dougherty
HAYDEN SHAFT, Leadville undergr, Ag, Pb, Zn, Mn
No Prod

CAMP BIRD COLORADO, INC
Suite 2110, 1st Natl Bank Bldg
Denver 2
Pres: C Maxwell Norman
VP: C P Tremlett
Sec: D C Dowkes
Mng Eng: H K Loenshal
CAMP BIRD MINE, Ouray, undergr, Pb, Zn, Cu, Ag, Au
Gen Mgr: Benton B Bailey
Geol: Mark L Ward
Mech Eng: John Ives
Mine Supt: E Roberts
Mine Frm: H Bartlett
Prod: 500 tons
500-TON FLOT MILL, Ouray
Mill Supt: D C Shelton
Mill Frm: R N Werber
Assay: C H McAboy

CAMPBELL, JESS Redvale
BALD EAGLE, ROOSEVELT AND RAVEN MINES, San Miguel and Montrose Counties, U_3O_8
Under devel

CAMPBELL, LYLE F
Box 1698, Grand Junction
BONANZA ADIT NO 3, Calamity Mesa, U_3O_8, V_2O_5

CANFIELD MINES
628 Rood Ave, Grand Junction
Own: Arthur Canfield
Gen Agt: L C Kopanos
MNG LEASE #6, San Miguel Co,

undergr, U_3O_8, V_2O_5

CARTER, CLIFFORD
Uravan
HORSEHAIR NO 1 MINE, U_3O_8
BETTY JEAN MINE, U_3O_8

CASTOR, BOYD
Naturita
SUNRISE #2 & #3, Corral Draw, U_3O_8

CASTOR, MILTON
Naturita
BLACK ROCK MINE & SUNRISE NO 5 MINE, U_3O_8

CHAPIN, LOUIS A
Placerville
PIE FACE NO 1, Mesa Co, U_3O_8

CLARK & HARRIS
Nucla
FAWN SPRINGS MINE NO 9, 11, 12, 18, 21, W of Naturita undergr, U_3O_8, V_2O_5
Gen Mgr: Oral Clark
(Leased from Union Carbide Nuclear Co)

CLEAR CREEK MNG CO
PO Box 325, Idaho Springs
VP & Purch Agt: Al Hoyl
Sec-Treas: Earl Ellis
Pres: Donald F Farris
LAKE CENTRAL PROJECT, Undergr, Au, Ag, Cu, Pb, Zn
Met: S Power Warren
Prod: 150 tons
FLOT & GRAV MILL, Idaho Springs

CLIMAX MOLYBDENUM CO (A DIVN OF AMERICAN METAL CLIMAX, INC)
1270 Ave of the Americas, New York, N Y
Pres: Wallace Macgregor
Sec: E A Weil
Treas: Donald Donahue
Purch Agt: J E Russell
CLIMAX OPERATIONS, Climax
Gen Mgr, Watn Opr: Robert Henderson
Res Mgr: Edwin J Eisenach
Gen Supt: Frank Windolph
Geol: Stewart Wallace
Elec Eng: U FToucher
Mech Eng: W R Allen
Met: Wm Gregory
Chf Eng: Horace Ham
Mgr, Engrg: M S Walker
MINE, undergr, MoS_2, WO_3, FeS_2, Sn
Mine Supt: William Distler
Asst Mine Supt: C A Cleaves, Joffre Johnson
Mine Frm: Dale Johnson, Jas Ludwig, A W Nelson, Cecil Smith
Mine Eng: Bob Zdechlik
Prod: 33,000 tpd
33,000-TON FLOT-GRAV MILL
Climax
Mill Supt: Fred J Hoff
Asst Mill Supt: Jas Shore
Mill Frmn: Fred Bender
Ch Chem: Robert Ziegler
(see N Y)

CLIMAX URANIUM CO, (SUBSID OF AMERICAN METAL CLIMAX INC)
PO Box 989, Grand Junction
Pres: Frank Coolbaugh
VP & Gen Mgr: A M Mastrovich
Purch Agt: L J Mann
Consult: E J Duggan
Asst Treas: A R Eikenbary
Asst Sec: J D Carnahan
MINES, near Grand Junction, undergr, U_3O_8, V_2O_5
Mgr Mines: T E McCandless
Prod: Andy O'Korn, E D Bieber, E A Roberts
Ch Geol: Phillip Donnerstag
Geol: R P Darnell, Robert Nakaoka, Roland Warner
CHEM MILL, Grand Junction
Plant Mgr: R C Toerper
Mill Supt: Paul Wire
Master Mech: G K Burnhart
Ch Met: R E Musgrove
Ch Chem: Q S Kocher
(see Ariz, NY, Utah)

COG MINERALS CORP
Denver Club Bldg, Denver
Pres: W C Norman
VP & Treas: F O Griffin
Sec: C W McDermott
Oper Mgr: Frank A Seeton
(see Calif)

COLE & BOND
Uravan
LUCKY DOG, ANNA MAY, HAPPY THOUGHT, CANON #7, WILSON BOBTAIL MINES, west of Naturita, undergr, U_3O_8 V_2O_5
Gen Mgr: Ennis Cole
(Leased from Union Carbide Nuclear CO)

COLE, JOE C
Box 274, Naturita
TEAPOT DOME #2, TOWNSITE, FAWN SPRINGS #5, MINES, W of Naturita, undergr, U_3O_8, V_2O_5
(Leased from Union Carbide Nuclear Co)

COLO AGGREGATES CO, INC
Mesita
Pres: Geo M Oringdulph
VP: Martha Martin
Sec-Treas: Henry Quiller
MESITA HILL MINE, 2 mi W of Mesita, surface, volcanic sturiz
Gen Mgr: Geo M Oringdulph
Frm: Robert Compton
Prod: 300 tons

COLO FUEL & IRON CORP
Continental Oil Bldg, Denver
Pres: A F Franz
Sec: D C McGrew
Treas: H C Crout
MINING DEPT, Box 316, Pueblo
VP, Oper: J J Martin
Dir, Purch: L C Rose
Mgr, Mines: R R Williams Jr
Ch Eng, Mng Dept: W J Schenler
Ch Geol: D A Carter
MONARCH QUARRY, limestone, Salida
Supt: J E Whitney
Prod: 3000 tons
CANON DOLOMITE QUARRY, Canon City
Supt: E C Jagow
Prod: 325 tons
(see Utah, Wyo)

COLORADO TUNGSTEN CORP
401 Pine, Boulder
Res Mgr: Harrison S Cobb
MINE, undergr, open pit, placer WO_3
No Prod

COMMERCE MNG CO
509 Olive St, St Louis 1, Mo
Pres: G H Fox
MIKADO MINE, Leadville, undergr, Pb, Zn, Au, Ag
Geol: H F Mills
No Prod
(see Mo)

CONGDON & CAREY
First Natl Bank Bldg, Denver 2
Gen Part: Thomas E Congdon, William J Carey
Geol: Harry E Haynes, Dolf W Fieldman
(Climax Uranium Co, Lessee)
(see Ariz)

CONTINENTAL MATERIALS CORP (FORMERLY CONTINENTAL URANIUM INC)
820 Ninth St S, Grand Junction
Bd Chmn: Gerald Gidwitz
Pres: Willard Gidwitz
Sec: Max H Braun.
Gen Supt: C H Reynolds
Supt of Mines: J G Roscoe
Under devel
(see Utah, Wyo)

CONTRACT ENGINEERING CO
1727 Boulder St, Denver 11
Pres: Alfred G Hoyl
LAKE CENTRAL PROJECT, Idaho Springs, Au, Ag, Pb

COOLEY GRAVEL COMPANY
6101 Lowell Blvd, Denver 21
Pres: C G Cooley
VP & Gen Mgr: E J Wemlinger
Sec-Treas: D G Hughes
COOLEY GRAVEL PIT, Adams Co, Au, Ag
Mech Eng: H O Enderud
Mine Supts: J B Cooley, M R Williams, Wm G Adams

CORDILLERA MNG CO
PO Box 664, Grand Junction
LIBERTY BELL NO 1, Mesa Co, U_3O_8
Under devel

COSTELLO LEASE
Bonanza Rt, Villa Grove
Op: W J Costello
RAWLEY MINE, Bonanza, 20 mi NW of Villa Grove, undergr, Pb, Zn, Ag, Cu
Prod: 50 tons

COTTER CORP
PO Box 751, Canon City
Pres: Parker Wilson
VP: David P Marcott
Sec-Treas: R J Gaskin
Purch Agt: Wesley K Carhartt
MINE, undergr, open pit, U_3O_8, ThO_2
Gen Mgr: David P Marcott
Mine Supt: C Swaeby
200-TON CARBONATE LEACH URANIUM MILL
Mill Supt: Glen E Hanson
Mill Frm: Guy Winslow
Assayer: Myles Fixman

CECIL CRANDALL
Redvale
MINE, U_3O_8

CRESSON CONS GOLD MNG & MLG CO
PO Box 47, Victor
Pres: Merrill E Shoup
VP: Max W Bowen
Sec: Adolph F Zang
Treas: John Jacobs, Jr
Purch Agt: C H Carlton
CRESSON MINE, Victor
Gen Mgr: Max W Bowen
Gen Supt: C H Carlton
Mech Eng: George Lorenz
No Prod

CROWN MNG CO
Box 664, Grand Junction
BLACK MAMA MINE, Mesa Co, U_3O_8
LIBERTY BELL MINE, U_3O_8
CORVUSITE MINE, U_3O_8

D & J URANIUM & EXPLOR CO, INC
325 N Santa Fe, Pueblo
Pres: Russell L Jewett
Sec: Chas M Warner
Treas: Seamon A Jewett
Dir: Glenn A Sander
Sales Mgr: George J Schmitt
BONITA MINE, Pueblo, undergr U_3O_8
Eng: Walter Burlesson
Under devel

MARIO DALPEZ
Norwood
MINE, U_3O_8

DAVIS & GOFORTH
Dove Creek
JIM MINE, San Miguel Co, U_3O_8

DENVER-GOLDEN CORP
1820 First Natl Bank Bldg Denver
Pres: Charles O Parker
VP & Gen Mgr: G H Brodie
Sec: Roy O Goldin
Treas: Barney Janow
SCHWARTZWALDER MINE, Ralson Creek, Box 109, Golden
Jefferson Co, undergr, U_3O_8
Mine Supt: E C Rice
Asst Mine Supt: Clyde I True
Geol: Allan G Bird
BURBANK TUNNEL, Ag, Au

DEVEREAUX BROTHERS
Box 373, Meeker
BURRELL MINE, Rio Blanco Co, U_3O_8
COAL CREEK NO 1, U_3O_8
MARVIN VIEW MINE, U_3O_8
Under devel

THE DOCTOR JACK POT MNG CO
PO Box 47, Victor
Pres: Merrill E Shoup
VP: Max W Bowen
Sec: Hazel Bates
Treas: John Jacobs Jr
Purch Agt: C H Carlton
DOCTOR JACK POT MINE, Victor, Au, Ag
Gen Mgr: Max W Bowen
Gen Supt: Charles Carlton
Mech Eng: George Lorenz
No Prod

DOEPKE MNG CO
2431 N Nevada Ave
Colorado Springs
Mgr: Frank D Doepke
GOLD KING, LEXINGTON, & MATTIE L MINES, Teller Co, Au
Under devel

DOUBLE BUCK URANIUM INC
Egnar
MINE, U_3O_8

DULANEY MNG CO
312 First Natl Bank Bldg
Grand Junction
Pres: R O Dulaney
VP: C H Dulaney, Harry B Friedman, F H MacPherson
Purch Agt: Robert B Burns
Gen Mgr: Frank H MacPherson
Gen Supt: Leroy Hemphill
Geol: Philip P Powers
Mech Eng: Ralph Smith
RADIUM GROUP OPER, 31 mi N of Dove Creek, undergr, U_3O_8, V_2O_5
Prod: 1,800 tons

ROBERT LEE DYER
PO Box 215, Naturita
MINE, U_3O_8

EAST RIDGE CO
Box 559, Ouray
Pres: Carlton E Byrne
VP: F Moldenhauer
Sec: Alice Davenport
ANDRUS MINE, 4 mi W of Red Mtn Pass, undergr, Zn, Pb, Cu, Ag, Au
Gen Mgr: Philip V Doyle
Under devel
(see Calif)

ECKMAN, W B
Box 127, Naturita
PARADOX "D" MINE, undergr U_3O_8, V_2O_5
(Leased from Union Carbide Nuclear Co)

EGGERS, C
Dove Creek
DOLORES APRIL MINE, Slickrock dist, San Miguel Co, undergr,
Prod: 20 tons

FRANK ELDER
Naturita
MINE, U_3O_8

THE ELKTON CO
PO Box 47, Victor
Pres: Merrill E Shoup
VP: Max W Bowen
Sec: Hazel Bates
Treas: John Jacobs Jr
Purch Agt: C H Carlton
ELKTON MINE, Victor, Au, Ag
Gen Mgr: Max W Bowen
Gen Supt: C H Carlton
Mech Eng: George Lorenz
No Prod

EMMONS MNG CO
Naturita
MINE, U_3O_8

EMPERIUS MNG CO
Emperius Bldg, Creede
Pres: T B Poxson
Treas: H B Hayden
Gen Mgr: T B Poxson
EMPERIUS MINE (ROBINSON & AMETHYST), 1 1/2 mi N of Creede, undergr, Pb, Zn, Ag, Cu, Au
Mine Supt: T B Poxson
Mine Frm: T J Phillips
Prod: 120 tons
150-TON FLOT MILL, 1 mi S of Creede
Mill Supt: H S Wheeler
Asst Mill Supt: W P Mitchell
Assay: Gordon Hosselkus

THE EMPIRE LEE MNG CO
PO Box 47, Victor
Pres: Merrill E Shoup
VP: Max W Bowen
Sec: Hazel Bates
Treas: John Jacobs, Jr
Purch Agt: C H Carlton
EMPIRE LEE MINE, Victor, Au, Ag
Gen Mgr: Max W Bowen
Gen Supt: Charles Carlton
Mech Eng: George Lorenz
No Prod

EQUITABLE URANIUM CORP
727 Cooper Bldg, Denver
Pres: Melvin C Bowles
VP: A L Heflin
Sec: Glenn C Leader, Jr
GOVERNOR MINE & CLAIMS
Box 352, Biship Canyon, Slick Rock Mng dist, undergr, U_3O_8 V_2O_5
Gen Mgr: Melvin C Bowles
Supt: Vernon K Bowles

EUREKA TUNGSTEN CO
3255 S Cherokee St Englewood
Part: John S Keifer, E B Ralston
EUREKA MINE, Sugar Loaf mng dist, Boulder Co, undergr, WO_3
Gen Mgr: E B Ralston
No Prod

FALL RIVER EXPLORATION & MNG CO
Box 32, Idaho Springs
Pres: Mark Stepelton
Sec& Purch Agt: Don West
Treas: Frank Malone
LUCANIA MINE, undergr, Pb, Cu, Ag, Au
Gen Mgr: Don West
Gen Supt: Chas Fetterhoff
Mine Eng: Warren Prosser
Met: Stanley Hill
Asst Mine Supt: William Brady
Prod: 300 tons
Under devel

FIBREBOARD PAPER PRODUCTS CORP
475 Brannan St, San Francisco 19, Calif
Pres: E W Carey
VP: M R Baruh, G W Burgess, J H Grady, J B Fagot, A S Halley, J F Havard, O C Majors, W K Spence
Sec: J S Mitchell
Treas: V H Erickson
Purch Agt: B A Wilson
COALDALE QUARRY, PO Box 269, Florence, Colo, open pit, Gypsum
Florence Plant Mgr: R K Comann
Mine Supt: L E Lewis
MILL, Coaldale
(see Calif)

FLANDERS MNG CO
(see Pacific Industries, Inc)

JOSIE K FOLSOM MNG & MLG CO, LTD
4280A Holly Ave, St Louis 15 Missouri
Pres: Oscar F Huegal
Sec-Treas & Purch Agt: Fred W Kublin
JOSIE K FOLSOM MINE, Saguache Co, undergr, Au, Ag
Gen Mgr: Fred W Kublin
No Prod

FOOTHILLS MNG CO
3240 6th St, Boulder
MINE, U_3O_8

FOREST QUEEN MINES INC
Box 396, Crested Butte
Pres: Dr Clarke
Sec: Edward L Hahn
FOREST QUEEN MINE, Irwin, undergr, Ag, Au, Pb, Zn
Gen Mgr: John H Hahn
Under devel
25-TON FLOTATION MILL, at mine

FOSTER, HERBERT
1217 Colorado Ave, Grand Junction
MESA NO 5, Mesa Co, U_3O_8

FOSTER, RALPH & SONS
1217 Colorado Ave
Grand Junction
SNOW SHOE, MESA #5, & #8, MINES, Outlaw Mesa, U_3O_8, V_2O_5

FOUR CORNERS EXPLORATION CO, INC
Box 116, Grants, N Mex
BACHELOR MINE, San Miguel Co, Colo, U_3O_8
DREAMER-GOOD HOPE
Fremont Co, U_3O_8
LUCKY JIM MINE 1-2-3, Park Co, U_3O_8

FOUR CORNERS OIL & MINERALS CO
1700 Broadway, Denver 2
Pres: D M Hillis

Sec: T J Murphy
LION CREEK & GREEN RIVER MINES, undergr, U_3O_8, (Bull Canyon Group)
Gen Supt: W R Bronson
Mng Eng: Rex Smith
(see Utah, Wyo, & Largo Uranium Corp, N Mex)

FOY & DAVIS MNG CO
Dove Creek
MINE, U_3O_8
Under devel

LYLE G FRANCIS
PO Box 204, Moab, Utah
MINE, U_3O_8
(see Utah)

THE FRITZ ERICKSON MNG CO
PO Box 385, Dove Cr,
JACKIE WALLS 1-4 MINE, U_3O_8
S B GROUP MINE, U_3O_8
TAILHOLT MINE, U_3O_8

FRONT RANGE MINES INC
Rm 405 - 1536 Welton St
Denver 2
Pres & Gen Mgr: John Deerksen
VP: Paul R Spencer, Robert S Mitchell
Sec-Treas: M T McGivern
MATTIE MINE, Clear Creek Co, Pb, Au, Ag
No Prod
MELVINA MINE, Boulder Co, Au
No Prod
STRONG & MARY CASHER MINES, Teller Co, Au
KING SOLOMON GROUP
No Prod
CLEAR CREEK FLOT MILL, Dumont
Cap: 200 tons

GADDIS MNG CO
Suite 1500, 1700 Bdwy Bldg
Denver U S Natl Bank Center, Denver
Pres & Treas: W H Gaddis
VP & Sec: Loren E Smith
ELK PARK MINE, Silverton, San Juan Co, undergr, U_3O_8
Under devel

GARDNER & SON MNG CO
Box 505, Grand Junction
CALAMITY NO 8 & NO 20, Calamity Mesa, U_3O_8, V_2O_5

GAYNO MNG CO
c/o O C Brown
Box 847, Montrose
GAYNO GROUP & LEASE
#46 MINES, San Miguel Co, U_3O_8

GIANT CYCLE CORP
Box 86, Carlton Bldg
Colorado Springs
Pres: Merrill E Shoup
Exec VP & Gen Mgr: Max W Bowen
Asst Gen Mgr: G Murray
Sec: H Bates
Treas: John Jacobs, Jr
Under devel
(see S D)

GIBRALTAR MINERALS CO
Box 35067, Dallas 35, Texas
LOOKOUT GROUP MINES, Saguache Co, U_3O_8

GLOBE HILL MNG CO
225A Independence Bldg
Colorado Springs
Pres: H J Anderson
VP: R W Beal
Sec-Treas: R B Murray
Asst Secy: Julia Davison
PHONOLITE MOUNTAIN URANIUM MINE, Cripple Cr, open pit, U_3O_8, autunite
Asst Gen Mgr: Stan Balcomb
Gen Supt: George West
Geol: T W Anderson
Mech Eng: Lloyd Collard
Asst Mine Supt: L D Anderson
Mine Frm: Earl Robush
No Prod

GLOBE MNG CO (Unit of Union Carbide Corp)
Grand Junction, Box 1049
(see Wyo)

GOLD ANCHOR MINERALS INC
c/o Doug Watrous, Box 444
Idaho Springs
GOLD ANCHOR MINE, Clear Creek, Au, Ag
No Prod

GOLD KING DEVELOPMENT CO, INC
PO Box 476, 1338 Greene St, Silverton
Pres: A W Freeland
Sec: W A Way
GOLD KING MINE, undergr, Au, Ag, Pb, Zn, Cu, Mn
Gen Mgr: A W Freeland
No Prod

GOLD CREST MNG CO
Box 351, Crested Butte
Pres: R F Magor Jr
VP: R F Magor, III
SKYLINE #1 & PAINTER BOY, open pit, placer, Au, Ag, Pb
Gen Mgr: R F Magor, III
Gen Supt: F Hodgeson
Prod: 300 tons
100-TON FLOT-GRAV MILL, Crested Butte
No Prod

GOLDEN AGE URANIUM CORP
Jamestown
MINE, Gilpin, Au, Ag
No Prod

GOLDEN CYCLE CORP
PO Box 86, Carlton Bldg
Colorado Springs
Pres: Merrill E Shoup
Exec VP &Gen Mgr: Max W Bowen
Asst Gen Mgr: G Murray
Treas: John Jacobs, Jr
Sec: H Bates
Mines Mgr: Charles Carlton
Purch Agt: Howard Stone
AJAX MINE, Cripple Creek, Au
Supt: Jack Walker
1,000-TON FLOT-CYAN MILL (Carlton Mill), at mine
Supt: Wm Klein
URANIUM DIVISION MINE, Atkinson Mesa, near Uravan
Supt: T J Ballard
MINE, Marysvale

GOLDEN SHAFT MINE
Box 335, Central City
Own: Morrison Garrick
Orlando C Allison
GOLDEN SHAFT MINE, Silver Creek, undergr, placer, Au, Ag, Cu
Gen Mgr: Morrison Garrick
Asst Gen Mgr: Orlando C Allison
No Prod

GOLDSWORTHY, DAVID
Montrose
RAY LEE NO 1, San Miguel Co, U_3O_8

GOMEZ & GURWELL
Egnar
MINE, U_3O_8

GOODE, TRUMAN
Naturita
RAY LEE NO 1, San Miguel Co, U_3O_8

GRANDBOUCHE, GEORGE
Box 867, Cortez
MINE, U_3O_8

GRAPEVINE MNG CO
Morrison
MINE, U_3O_8

GLEN GREAGER
Norwood
MINE, U_3O_8

JACK GREAGER
PO Box 72, Norwood
MINE, U_3O_8

GREAT LAKES CARBON CORP
PO Box 308, Antonito
MILL, Antonito
Mill Supt: A K Muir
(see Calif, Nev, N Mex, Ore)

GREAT WESTERN AGGREGATES, INC
806 Boston Bldg, Denver
Ops: Ernest W Munroe
GOODWIN QUARRY, surface, gypsum

GREEN RIVER OIL & URANIUM CO
26 W Broadway #1
Salt Lake City, Utah
Pres: Fallas M Kelly
Sec-Treas-Purch Agt: Austin B Smith
VANDIUM QUEEN PROPERTIES, San Miguel Co, undergr, U_3O_8 (Leased)
VANADIUM QUEEN MINE
Gas Hills Area
Leased to Carl Weaver, Grand Junction, mng oper by Lucky Mc Uranium
(see Wyo, Utah)

GRIPE, WOODROW E (Lessor)
Box 225, Naturita
EARLY MORN, Big Gyp Valley undergr, V_2O_5, U_3O_8
Prod: 2 tons
WALLEY'S CLAIM, Slickrock dist, V_2O_5, U_3O_8
Prod: 10 tons
BALD EAGLE, MORNING GLORY AND SARAH ELLEN MINES, San Miguel Co, U_3O_8

GUNNISON MNG CO
Box 539, Gunnison
Pres: A D Haas
VP: J L Robison
Sec-Treas: Duffy Salinger
Purch Agt: William R Johnson
LOS OCHOS MINE, approx 23 mi SE Gunnison, undergr, U_3O_8
Gen Mgr: John L Robison
Mine Supt: Leslie C Ross
Geol: Vern Garton
Asst Mine Supt: T M Wilson
Mine Frm: Roscoe Riddle
Mine Eng: Paul Garding
Prod: 400 tons daily
400-TON SOLVENT EXTR MILL, approx 1 1/2 mi SW Gunnison U_3O_8
Mill Supt: F D Jackson
Maint Supt: Robert A Rule
Assayer: Geo Runyon
LAST CHANCE MINE, 331 N 5th, Canon City, open pit, U_3O_8
Prod: 30 tons daily

H-D-C (HESSER, DRAKE & COLE)
PO Box 32, Loveland
Part: L J Hesser, L M Drake, Everett Cole
PENN HILL MINE, BULLGER BASIN PLACER CLAIM, Fairplay Hotel, Fairplay, open pit & placer, Au
Gen Mgr: L M Drake
Asst Gen Mgr: L J Hesser, Everett Cole
Prod: 300-400 cu yds
500-TON GRAV TROMMEL SCREEN MILL with sluice boxes, jig & retort
Prod: 4-5 lb Au monthly

VERLE HAMILTON
PO Box 626, Cortez
MINE, U_3O_8
Under devel

HARMON, ALBERT J
Box 422, Fruita
RIMROCK, BLUE #3 NORTH MINES, undergr, west of Naturita, U_3O_8, V_2O_5
Gen Mgr & Supt: Albert J Harmon
(Leased from Union Carbide Nuclear Co)

HAWKINS, O H
1857 N 30th St, Kansas City 4, Kansas
FARMER BOY MINE, Hesperus, undergr, Au, Ag, Pb, Zn
Under devel

HERD & RUSH
Naturita
MINE, U_3O_8

HESS DRILLING CO
1244 4th Ave, Durango
Own: E L Hess
MINE, U_3O_8

HOLLING, HENRY
PO Box 7, Egnar
COUGAR GROUP, San Miguel Co, U_3O_8

HOLMES, THOMAS W
1831 N 9th St, Grand Junction
OCTOBER ADIT MINE, John Brown Mesa, U_3O_8, V_2O_5

HUFF MNG CO
1020 Bookcliff, Grand Junction
BELL GROUP MINE, San Miguel Co, U_3O_8

HUGHES, C L
Moab, Utah
FAULT NO 1, Montrose Co, U_3O_8
Under devel

HUMPHREYS ENGINEERING CO
910 American Natl Bank Bldg, Denver 2
Pres: I B Humphreys
VP: A Humphreys, Frank M McKinley, Jay P Wood
E C Weichel, Jr
Sec: W T Hostetter
Treas: E L Dailey
(see Humphreys Mining Co, Fla)

ALVA HUNT
Rt 4, Box 67, Montrose
BELL & WINDY DAY GROUP, Lower San Miguel Mining Dist, undergr, open pit, U_3O_8, V_2O_5
Under devel & producing

HUNTER MNG & MLG
PO Box 125, Telluride
Own: Dan F Hunter Jr
BURRO GROUP MINE, Au, Ag, Cu, Pb, Zn
PINTO MINE, Ag, Pb, Au
WATERFALL MINE, Pb, Ag, Au
SAN JUAN MINE, undergr, Au, Ag, Cu, Pb
Gen Mgr & Geol: Dan F Hunter
Mine Frm: O E Blixt
Mine Eng: Charles Turner
Prod: 30-50
3.5 TON PER HOUR GRAV MILL, at mine, T&R concentrators, under test work
Mill Supt: James Storkey
Assay: Bill Parris
MATTERHORN MILL, 3.5 tons, per hour
MORNING STAR MINE (leased from John Reece), undergr, Ag, Au, Pb, Zn
Gen Mgr: John Reece
Geol: Dan Hunter Jr
Under devel
5-TON PER HOUR GRAV MILL, T&R concentrators, under test work, tails and dumps only
Prod: 50 tons

IBEX URANIUM INC
POBox 550, Montrose
Pres: Theodore L Brooks
VP: Jack R Cagle
Sec-Treas: Stewart C Lee
Geol: Max A Krey
MINES & CLAIMS Montrose & San Miguel Coe, undergr U_3O_8
Under devel

IDARADO MNG CO
Ouray
Pres: M D Banghart
IDARADO MINES, 12 mi SW of Ouray on Red Mt, & TELLURIDE MINES at Pandora, under gr, Cu, Pb, Zn
Gen Mgr: John S Wise
Gen Supt: A C Hilander
Mine Supt: John Kearney
Ch Clerk: Geo C Forbes
Mech Supt: W L Griffiths
Ch Eng: Jack C Keenan
Prod: 1,800 tons
FLOT MILL, Pandora
Supt: K Tatman
Cap: 40,000 tons ore per month (see N Y)

IRON SPRINGS PLACER
1654 Canon Ave,
Grand Junction
Own: Boyd Robinsen
IRON SPRINGS PLACER MINE
Ophir, surface, Fe_2O_3
Prod: 10 tons

JACKPOT OIL CO
Travel Center Bldg.
1640 Court Place, Denver
Pres: Paul R Clark
VP: Gordon Clark
Sec-Treas: M H Earhart
BALD EAGLE MINE, Idaho Springs, undergr, Au, Ag, Pb, Cu
Gen Mgr: Paul R Clark
Mine Supt: Pete Leavitt
Under devel
125-TON FLOT MILL, Idaho Springs
Mill Supt: E Roberts

JOHANNSEN & KELLY MNG CO
Slick Rock
DELUXE & MASTER DELUXE MINES, U_3O_8, V_2O_5
Prod: 15 tons

JOHNS - MANVILLE PRODUCTS CORP
22 E 40th st, New York, NY
Pres: C B Burnett
VP: K W Huffine
Sec: H M Ball
Treas: J M Shackleford
Purch Agt: D H Lyons
MINE, office in Antonito; mine at No Agua, New Mex, open pit, perlite
Mine Mgr: M B Mickelson
MECHANICAL SEPARATION MILL, at mine
(see Calif, N Mex, NY)

JONES LEAD & ZINC MINES CO
Box 931, Leadville
Own: Robert L Jones
GARIBALDI MINE, 2 mi E of Leadville, undergr, Pb, Zn, Au, Ag
No Prod

JOSEPH, ED
Norwood
MINE, U_3O_8

JUNIPER OIL & MNG CO
415 C A Johnson Bldg.
Denver 2
ARTIC 1-11, Dix 4-7 & 10-28, ELCO 3-7, FORT 1-4, GARDNER 1-3, HASTY NO 1 MOOSE 1-6, MINES, Fremont Co, U_3O_8
OLIVE 27-29, 91, 97, 101, SNOOPER-DICKSON, SUNRISE 1-9, THORNE CLAIMS, placer and open pit, U_3O_8
Supt: Chas J Lyden

K M B PROSPECTORS
Box 336, Lake City
Pres: Claude Beauchamp
VP: Robert D Kelley
Gen Mgr: J A Mullins
BETH #1 MINE, Hinsdale Co, U_3O_8
Gen Supt: Robert D Kelley
Under devel

KENDRICK BAY MNG CO
Mines Park, Golden
Pres: Wallace Macgregor
VP: Ernest Jones, Horace A Sawyer, Jr
Sec: John P Fitz-Gibbon
Treas: J D Carnahan
(see Alaska)

KERKLING & SLENSKER
1800 Dover St, Lakewood
BRANNAN PIT NO 8, 10
F S RIZZUTO GRAVEL PIT
ISLAND S & G MINE, Adams Co, Au, Ag
W P KERKLING PLACER, Jefferson Co, Au Ag

KERR-MCGEE OIL INDUSTRIES, INC
Rt 1, Box 299 A
5850 McIntyre Rd, Golden
RESEARCH LABORATORY
Mgr, Mineral Devel & Research: V L Mattson
(see Ariz, N Mex, Okla, Wyo & Kermac Nuclear Fuels, N Mex)

KING & FRITZ MNG CO
215 - 4th St, Castle Rock
Pres: Ross King
VP: Don Fritz
Sec: Alberta King
Treas: Donna Jo King
Purch Agt: Paul W King
THREE MUSKETEERS, LITTLE EDDY, CALIFORNIA LODE MINES, Douglas Co, open pit, pegmatites
No Prod

CARL A KINSEY
Naturita
MINE, U_3O_8

KNIZLEY, E S
274 27th Road
Grand Junction
KARNS INCLINE MINE, Beaver Mesa, U_3O_8, V_2O_5

KOSTELIC, LOUIS LESSEE
203 W 3rd St, Leadville
BI-METALLIC MINE, undergr
Gen Mgr: Louis Kostelic
No Prod
20-TON-GRAV-MILL
Mill Supt: Louis Kostelic
Assayer: W H Smith
No Prod

KUYKENDALL, WARREN
Box 195, Naturita
DEER SHAFT #2 MINE, west of Naturita, undergr, U_3O_8 V_2O_5
Gen Mgr & Supt: W Kuykendall
Gen Frm: K R Cochran
(Leased from Union Carbide Nuclear Co)

LAPLATA GOLD CORP
1747 Park St, Salt Lake City, Utah
Pres: John B Hopkins
VP: C B Johnson
Sec: M W Hopkins
BESSIE "G" MINE, Hesperus, undergr, Au, Ag
Gen Mgr: Don M DeLoche
Met: John N Butler
Prod: 50 tons
Under devel
50-TON FLOTATION MILL, La Plata City
Mill Supt: B L Zimmerman
(see Utah)

LA SALLE MNG CO
Box 217, Grand Junction
Part: M M Hardin, Roy M Eidal
G T Rummel, M P Rowe
CLUB MESA MINE, undergr U_3O_8, V_2O_5, Uravan
Co-Mgrs: M P Rowe, G T Rummel
Undergr prod
FAIRDAY MINE, Jamestown, undergr, U_3O_8
Mine Supt: Carl Klatt
Prod: 50 tons
LA SALLE MINE, Jamestown, undergr, U_3O_8
Under devel

LABRUM, THERMER R
Uravan
BLACKFOOT MINE, Montrose Co, U_3O_8

LAMBERG, GLENN & SONS
Box 108, Salida
SILVER ROCKER GROUP, Be, mica, spar
Under devel
Prod: 30-40 tons,

LAMBERG'S SILVER ROCKER BENTONITE CO
Box 108, Salida
Pres: W D Lamberg
VP: G R Lamberg
Sec-Treas: H J Lamberg
CRATER GROUP, open pit, bentonite for agricultural use
Gen Mgr: W D Lamberg
Gen Supt: G R Lamberg
Geol: M Azhar Brutta
Asst Mine Supt: C E Berry
Prod: 80 tons

LAMBERTSON, JOHN
Box 567, Gunnison
STAR MINE GROUP, 55 mi N of Gunnison, undergr, Pb, Ag

LAYTON BROS DRUM CO
PO Box 765, Grand Junction
MINE, U_3O_8
Under devel

LEADVILLE LEAD CORP
410 Colorado Bldg, Denver
Pres: Robert G Risk
VP: Harvey Tedrow
Sec: Byron White
Treas: Kenneth Miller
Gen Mgr: James Tiffany
HILLTOP MINES, Fairplay, undergr, Pb, Zn, Ag, Cu
No Prod

LEE & SMALL MNG
PO Box 550, 431 Main St
Montrose
Stewart C Lee, U A Small, 130 S 3rd St W, American Fork Utah
Mine Eng: Max Krey
MINES & CLAIMS, Montrose & San Miguel Counties, undergr U_3O_8
Under devel

E E LEWIS, INC
PO Box 1491, Grand Junction
Pres: Elbert E Lewis
VP: John F Peeso
Sec: Gladys R Lewis
3 MINES, Colorado Plateau

LIPPOTH & WEIN DRILLING
200 North 6th St, Grand Junction
MINE, U_3O_8

LISBON URANIUM CORP
2909 Hwy 50, Grand Junction
GATEWAY PROPERTIES, Beaver Mesa, U_3O_8
Contractor: Charles V Woodward
Prod: 750 tons per mo

LIVERMAN, GEORGE & CUNNINGHAM, C
2236 Orchard, Grand Junction
ELIZABETH NOS 3 & 17, Blue Mesa, U_3O_8, V_2O_5

LODESTAR URANIUM INC (SUBSID OF CONTINENTAL MATERIALS CORP)
Box 1550, Grand Junction
DEPRESSION NO 6, Flat Top, U_3O_8 V_2O_5
No Prod

LONDON & LONDON
Box 217, Naturita
SILVER WING & GREAT EASTERN MINES, Silverton, Jones Gulch, undergr, Ag, Pb, Cu, Zn
Gen Mgr: Robert S London
Geol: Dale Carlson
Under devel

LESTER LOWERY
Ridgeway
MINE, U_3O_8
No Prod

M & S INC
Salida
Pres: J W Magnuson
Gen Mgr: R H Magnuson
HOMESTAKE MINE, Surface, feldspar

JERRY MAYFIELD
PO Box 251, Naturita
MINE, U_3O_8

McALESTER FUEL CO
PO Box 783, 309 E Wyandotte, McAlester, Oklahoma
Pres: J G Puterbaugh
VP & Gen Mgr: Tom E Garrard
Sec-Treas: Carl Oman
Geols Mine Eng: Robert Ford
(PO Box 428, Riverton)
MEEKER MINE, open pit, U_3O_8, V_2O_5
Gen Supt: Ralph Hawks

MEESE, WILLIAM
Box 83, Rifle
LUCKY BOY MINE, Calamity Mesa, U_3O_8, V_2O_5

MENA MNG CO
4925 Montview Blvd, Denver 7
Pres-Gen Mgr: J W Walsh
VP: M W Walsh
Sec-Treas: Paul W Schmitz
MENA MINE, Golden, Jefferson Co, undergr, U_3O_8, Cu, Ag, Au
Gen Mgr: J W Walsh
Gen Supt: Lee E Babcock
Prod: 12 tons

MICA MINERALS INC
1501 "H" St, Salida
Pres & Purch Agt: C Keith Alexander
VP: Doyle C Alexander
Sec-Treas: Charles E Dimit
100-TON MILL, Turret Dist, air vibration and screening of mica ore
Mill Supt: C Keith Alexander
Mill Frm: Loyd Angelo

MICRO COPPER CORP
Marshall Ct, Moab, Utah
BADGER, JOKER, LOG CABIN, PRINCESS, RED ROCK NO 5, LOC CORRAL DRAW, LOC STARLIGHT GRP & WILD CAT MINES, Montrose Co, U_3O_8, V_2O_5
QUARREL, PATTY, SUNRISE, PICKETT CORRAL MINES, Bull Canyon, Montrose Co, U_3O_8, V_2O_5, undergr
RED ROCK, WILD CAT MINES, Martin Mesa, Montrose Co, undergr, U_3O_8, V_2O_5
Gen Supt: Donald Andrews, Nucla
(see Utah)

MID-CONTINENT URANIUM CORP
Uranium Center Bldg, Grand Junction
Pres: Noramn E Ebbley
VP: Norman E Gillespie
Sec-Treas: Mark D Dunn
Purch Agt: John E Danielson
MINE, New Mexico
(see N Mex)

MILLS & BRISCOE
PO Box 307, Walsenberg
MINE, U_3O_8
No Prod

MINCO, INC
331 N Loomis, Ft Collins
Pres: Angel L Garnica
VP: W C Shaw
Sec: Ray Colard
Treas: Alvin Shaw
BLUE MOUNTAIN RIMROCK MINE, Lyons, at south base of Blue Mountain N of Lyons, open pit, Cu, Ag, Au
Gen Mgr: A L Garnica
Gen Supt: Ray Colard
Geol: Roy Colard
Mech Eng: Alvin Shaw
Met: A L Garnica
Elec Eng: Ray Colard
50-TON LEACHING & PRECIPITATION MILL, Lyons
Assayer: Charles O Parker

MINERAL CONCENTRATES & CHEMICAL CO
2307 W 8th St, Loveland
Pres: Howard Hee
VP & Purch Agt: R L Bender
Sec: Wm Loefler
Treas: R Myre
Min Eng: T Johnston
24-TON FLOT MILL, Loveland
Mill Supt: R L Bender
Asst Mill Supt: T Johnston
Mill Frm: R Evans
Assay: C Price
CHEMICAL SMELTER, Loveland
Supt: R L Bender
Asst Supt: Wm Badger
Metal output: 15,000 lbs beryllium yrly

MINERAL PRODUCTS INC
5365 King St, Denver 21
Pres: M Biggs
VP: W Bennett
Treas: F I Biggs
BOOM MINE, Montezuma, undergr
Gen Mgr: W Bennett
Gen Supt & Geol: M I Biggs
Mine Eng: M I Biggs
Under devel

MINERALS ENGINEERING CO
801 4th Ave, Grand Junction
Pres: R G Sullivan
VP: Robert W Price
Sec: Glen P Wilson
Treas: Richard Warren
Purch Agt: Edson Foster
(See Mont, Utah)

MINERALS EXPLORATION & DEVELOPMENT CORP
3510 Lee St, Wheatridge, and 1772-22nd St, Ogden, Utah
Pres: Vel Klein
VP: Fred T Lopez
Sec-Treas: Cliff Crossan
(see Utah)

MINERALS PROD CO OF CALIF
1299 Bayshore Highway
Burlingame, Calif
Pres: George N Keystan Jr
VP: H H Van Aken
Sec-Treas: David H Keystan
MARY MURPHY MINE, Romley undergr, Pb, Zn
Gen Mgr: H H Van Aken
No Prod
(see Calif)

MINES DEVELOPMENT, INC
777 Grant St, Denver 3
Pres: Allen D Gray
Sec-Treas: W H Hoadley
Asst Sec: T J Vogenthaler
Asst Treas: R C Maysing
Purch Agt: P M Cheney
MILL, Edgemont, S Dak
(see S Dak)

MNG BUREAU OF ANALYSIS
Box 867, Cortez
Pres: G R Grandbouche
(see Utah)

MOLYBDENUM CORP OF AMERICA
Empire
URAD MINE & MILL, undergr
Mo, MoS_2
Mgr: John B Carman
No Prod
(see Calif, N Mex, N Y, Pa)

MONON LEASING CO
Creede
Sec-Treas: W W Wright
MONON MINE, undergr, Pb, Zn, Ag, Au
Geol: Ivan Weaver
Mech Eng: J J Williams
Met: G E Hosselkus
Mine Frm: Ivan Weaver
Under devel

MONTGOMERY, JACK
Gateway
BLACK MAMA MINE, Tenderfoot Mesa, U_3O_8, V_2O_5
CHICO FRACTION MINE, Mesa, U_3O_8
K NO 5 MINE, U_3O_8
LAVADA MINE, U_3O_8

MONTROSE MILLING CO
508 Main, Montrose
Pres: William R Nichols
VP: O C Baker
Sec: Pearl Aldasoro
AMERICAN NETTIE MINE, Gold Hill, Ouray, undergr, Au, Ag, Cu
Gen Mgr: William R Nichols
Asst Gen Mgr: Albert Baroni
Mine Frm: Frank Townsend III
Under devel
Prod: 50 tons
GRAVITY MILL, Montrose
Mill Supt & Frm: O C Baker

MORRISON STONE CO, LTD
Rt 3, Box 367, Golden
MORRISON STONE CO #1 MINE, Morrison, N of city limits on Colo Hwy 93, undergr, building stone
Gen Mgr: C E Morrison
Prod: 25 tons
40-TON CRUSHING PLANT, Morrison
Mill Supt: C E Morrison

MUNROE, ERNEST W
Rt 2, Box 273, Fort Collins
GOODWIN QUARRY, Larimer Co, gypsum

NATIONAL BERYL AND MNG CO
Box 1605, Estes Park
Pres: A L Vaughn
VP: Ed Schuber
Sec: J O Mall
Treas: Victor Walker
MINE, No Branch of Big Thompson Rd, Larimer Co, open pit, beryl, feldspar, mica
Under devel

NATIONAL LEAD CO, INC
(Member Nuclear Metals Div Nat'l Lead Co)
PO Box 1849, Grand Junction
Grand Junction Office
Tech Dir: Dr L E Crompton
AEC Research Contractor
Radioactive polution studies
(see Ark, Calif, La, Mont, Mo, Nev, Tenn, N Y, Tex, Wyo)

NATOMAS CO
Fairplay
DREDGE #1, Park Co, Au, Ag
Local Supt: Webb Skinner
No Prod
(see Calif)

NEDERLAND MINES, INC
1821 Marine St, Boulder
Pres: Carl Rosen
VP & Sec: G A Horvath
CARIBOU MINE, Boulder, 5 mi W of Nederland, undergr, Ag, Pb, Au
Gen Mgr: Matthew Olsen
No Prod
100-TON FLOT MILL, 6 mi E of Nederland

NEESHAM MNG CO
Box 458, Nucla
Gen Mgr: Glenn D Neesham
BUCKSKIN MINE, Bull Canyon, undergr, U_3O_8, V_2O_5
PEGGIE, Sauser Basin, U_3O_8, V_2O_5
Under devel
RUSTY MINE, undergr, U_3O_8, V_2O_5

NEPTUNE URANIUM CORP
Uravan
Pres: W E Griffith
VP & Gen Supt: L A Griffith
Sec: Ray Carson
Treas: Fred Burns
URATEX GRP & PORK CHOPS MINE, undergr, U_3O_8, V_2O_5
Geol: Paul H Keating
Prod: 2-5 tons
Under devel

NEW IDRIA MNG & CHEM CO
Idria, San Benito County Calif
Pres: C Hyde Lewis
VP & Sec: Arthur W Goring
Treas: E A Fabiani
URANIUM DIVISION, PO Box 311, Grand Junction, undergr, U_3O_8, V_2O_5
PACK RAT, SHAKIN QUAKIE, JOHNNIE MAE, HUBBARD HOMESTEAD MINES, Beaver Mesa, undergr, U_3O_8 V_2O_5
Div Mgr: Dean Nicholson
(see Calif)

NEW JERSEY ZINC CO EMPIRE ZINC DIV
Gilman
Supt, Gilman Oper: W L Jude
Plant Chief: Harold Stienmier
Personnel: Frank Sherwood
Accountant, Darrell G Barnes
EAGLE MINE, undergr, Pb, Zn
Mine Chief: A M Karwacki
1,200-TON FLOT MILL
Mill Chf: Foster J Witthauer
(see Ill, N J, N Mex, N Y, Pa, Tenn, Va, Wis)

NICKERSON MNG CO
Box 171, Montrose
Own: Albert J Nickerson
CRIPPLE CREEK #3 & MUCKER MINES, Long Park, Montrose Co,
(Leased from Union Carbide Nuclear Co)

NUCLEAR ENGINEERING CORP
c/o Quist Seeman & Quist
415 Symes Bldg, Denver 2
LONG'S GULCH PLACER, Chaffee Co, pegmatites
No Prod

LEIGH D OHMAN
800 Bonnie Brae, Denver
MINE, U_3O_8
Under devel

OLD HUNDRED GOLD MNG CO
Box 448, Silverton
Pres: C Frayer Kimball
VP: Walter S Kimball
Sec: Mary K Boyden
GARRY-OWEN & OLD HUNDRED MINES, Pb, Zn, Cu, Ag, Au
Gen Mgr: W G Sandell
No Prod

OLIVER BROTHERS
Norwood
MINE, U_3O_8

CLINTON OLIVER
Naturita
MINE, U_3O_8

OMNI-METALS INC
Box 500, Salida
Pres: W E Burleson
VP: John A Murphy
Sec: Harold R Kester
GARFIELD MINE, 20 mi W of Salida, undergr, Pb, Au, Ag
No Prod

ORR MNG CO
Box 1636, Grand Junction
HENDERSON MINE, Outlaw Mesa, U_3O_8, V_2O_5

ORTMAYER MNG CO
320 S 1st St, PO Box 1846
Grand Junction
Pres: C G Ortmayer
VP: Hilda Ortmayer
Sec: John Speight
LEGIN LEASE, Egnar, undergr, U_3O_8, V_2O_5
Prod: 30 tons

OUTLET MNG CO
Box 11, Creede
Gen Part: James M Muir, Jr
Charles R Stewart
OUTLET MNG CO MINE, Creede, undergr, Pb, Ag, Au

Gen Mgr: James M Muir Jr
Asst Gen Mgr: Charles R Stewart
Mine Supt: Robert F Davis
Prod: 8 tons

OZARK-MAHONING CO MNG DIV
310 W 6th, Tulsa, Okla & Rosiclare, Ill
NORTHGATE MINE, undergr, open pit, fluorspar, Cowdrey
No Prod
350-TON FLOT MILL, at EMMETT & AFTERTHOUGHT MINES, undergr, fluorspar
Contr: H B Williamson
No Prod
120-TON FLOT MILL, at Jamestown
No Prod
(see Ill, N Mex, Okla)

PACIFIC BASE METALS INC
PO Box 2286, Denver 1
Pres: C J Kelch
VP: Dr C C Wahl
Sec: R L McLaughlin
REX MINE, undergr, beryllium, columbium, tantalum, mica
Gen Mgr: R L McLaughlin
Gen Supt: H Trobaugh
Under devel

PACIFIC INDUSTRIES, INC (FLANDERS MNG CO - wholly owned subsid)
PO Box 861, Grand Junction
Pres: H L McIntyre
VP: E M Gage, Mark K Shipman
Sec-Treas: Ronald Bailey
Asst Sec: Thomas K Younge
H B Fraser, Paul T Wolf
GATEWAY MINES, Gateway undergr, U_3O_8, V_2O_5
LA SAL GR MINE, Mesa Co, U_3O_8
MARGIE NO 2 MINE, Montrose Co, U_3O_8
Mine Frm: W R Maupin
Prod: 20 tons per day
(see Calif)

PACIFIC URANIUM MINES CO
1924 White St, Grand Junction
Pres: Dr M D Hassialis
VP: H E Roberts, Bernard Silbert
Sec-Treas: I Kellogg
Mgr: R L Redmond
(see N Mex)

PARK CITY CONS MINES CO
438 S Main St, Salt Lake City, Utah
Pres & Treas: Carl Stehle
VP: J L Chadwick
Sec: H Corkey Jr
KEYSTONE MINE, Crested Butte, 29 mi N of Gunnison, undergr; Zn, Pb, Cu, Ag
Gen Mgr: Nolan Probst
Geol: F T Stehle
250-TON FLOT MILL, Crested Butte
(Operated by American Smelting & Refining Co; see Calif, Utah)

SCHUYLER C PARKER & JAMES WEIR
PO Box 757, Durango
PENJU MINE, Klondike Ridge, San Miguel Co, undergr, U_3O_8, V_2O_5
No Prod

JAMES PATTERSON
Uravan
MINE, U_3O_8

PRESTON PERKINS
Naturita
MINE, U_3O_8

PETERSON, FREDDIE N
PO Box 531, Uravan
JEEP MINE, Montrose Co, U_3O_8

PETERSON, RICHARD L & ANDERSON, BRUCE
Box 9, Douglas, Wyo
GRACE-GREENWOOD MINE, Cripple Cr, Au, undergr
Geol: Warren Ove
Mine Frm: Louis Pfeffer
No Prod

PINNACLE EXPLORATION INC
100 Park Ave, New York 17, N Y
Pres: Philip D Wilson
VP: Joseph T Hall
Sec: Arthur Salo
Treas: R F Micari
PITCH MINE, 217 N Main, Gunnison; 10 mi SE of Sargents, undergr, U_3O_8
Gen Mgr: J E Dunn
Geol: Bill C Scott
Mine Frm: Sheldon R Houle
Mine Engr: David C McCrillis
Prod: 100 tons
(see N Y)

POLAND, C E & DWIGHT
Box 357, Grand Junction
HOPE MINE, Mesa Co, U_3O_8

POLAND CONSTRUCTION CO
834 S 7th St, Grand Junction
HOPE GROUP MINE, Blue Mesa, U_3O_8, V_2O_5

PONCHO OIL & MNG INC
28 W Broadway, Salt Lake City, Utah
CIVET CAT CLAIMS, San Miguel Co, U_3O_8
(Leased)

PRETTY BLUE MNG CO
PO Box 97, Placerville
MINE, U_3O_8
No Prod

QUINN, WILLIAM B
6322 West Park, St Louis, Mo
THE MAGDALENE MINE, Fawn Cr unorganized mng dist, Rio Blanco Co, undergr, U_3O_8
Under devel

RAMPART MNG CO
Box 1776, Colorado Springs
IRON MTN CLM, Fremont Co, Mn
COTTONWOOD NO 1, Fremont Co, Mn
RAMPART NO 1, El Paso Co, Mn
Under devel

RAY, ROBERT R
4440 Jason St, Denver 11
SUBURBAN SAND & GRAVEL PIT, Jefferson Co, Au, Ag

REID & REID
Naturita
MINE, U_3O_8

REX URANIUM CORP
Box 1238, Farmington, N Mex
DUCHESS MINE, Uravan, undergr, U_3O_8, V_2O_5
Gen Mgr: R J Scanlon
Lessee: A E David
AKAK MINE, Uravan, undergr, U_3O_8, V_2O_5
Gen Mgr: R J Scanlon
Mine Supt: Stan Reed
Prod: 30 tons per day
(see N Mex)

THE RICE DEVELOPMENT CO
Fruita
Pres: Max Osborne
VP: Cecil Haynie
Sec: L R Baker
BLUE CAP MINE, undergr V_2O_5, U_3O_8
Prod: 10 tons
(Mining contracted)

FRED RICHARDS & SON
Box 67, Nucla
MINERAL JOE NO 7 INCLINE MINE, U_3O_8

RICO ARGENTINE MNG CO
217 Kearns Bldg, Salt Lake City, Utah
Pres: Sherman B Hinckley
VP: J C Johnson
Sec: L J Lerwill
Treas: B B Hall
Purch Agt: Sherman B Hinckley
MT SPRINGS & ARGENTINE MINES, Rico, undergr, open pit, pyrite, Pb, Zn, Ag
Gen Mgr: Sherman B Hinckley
Assayer: H Tuller
150-TON FLOT MILL, at mine
Assayer: H Tuller
150-TON SULFURIC ACID PLANT, at mine
(see Utah)

JOHN B RIGG
1500 E 7th Ave, Denver
SUMMITVILLE MINE, Rio Grande Co, undergr, Au, Ag, Cu
Prod: 50 tons daily
CYANIDE MILL, Summitville
No Prod

RINDERLE, A C
404 Sherman Dr, Grand Junction
ARROWHEAD NO 22, Calamity Mesa, U_3O_8, V_2O_5
ARROWHEAD INCLINE NO 12, U_3O_8, V_2O_5

ROBINSON, BOYD
1654 Canon Ave
Grand Junction
IRON LODE NO 3, San Miguel Co, Fe

ROBECK, RAYMOND C
(Non operating partner)
535 Orchard Ave, Grand Junction
(see Utah)

ROBINSON RANCH MINES
Livermore
Own: Elbert C Robinson
RED HILL NO 1, LADY MOON MINES, undergr, open pit, U_3O_8, Fe, pyrite
Under devel

ROBUSH, JOHN & EARL
Box 205, Cripple Creek
HENRY EDNEY SHAFT, Teller Co, Au
Under devel

ALVA A ROCKWELL
Dove Creek
MINE, U_3O_8

HOMER ROSENQUIST
Nucla
MINE, U_3O_8

ROSS, L E
Placerville
MINE, U_3O_8

ROUVILLE, MNG CO
Silverton
Pres: Ernest S Hoffman
ROUVILLE MINE, Red Mt mng dist, Ouray Co, undergr, Pb, Cu, Ag
Gen Mgr: Ernest S Hoffman
Under devel

SABRE-PINON CORP
PO Box 1537, Bokum Bldg, Santa Fe, New Mex
Pres: R D Bokum II
VP: W R Montgomery, R P Dodge
Sec: W L Leeds
Treas: Hugh M Craigie
STEER #8 MINE, Bull Canyon dist, Montrose Co, undergr, U_3O_8
No Prod
(see N Mex)

SACRAMENTO GULCH MNG CO
979 Miller St, Lakewood 15
Pres: Arthur A Cervi
VP: Sisto Cervi
Sec: May Cervi
SACRAMENTO MINE, Park Co, undergr, Ag, Au, U_3O_8
Mine Supt: Cervi
No Prod

ST JUDE MNG CORP
PO Box 1005, Pueblo
Pres: L G Dalle
VP: E B Ley
Sec-Treas: Jack C Costanza
SWEET HOME MINE, Alma
(Leased from Edwin C Spray)
undergr, Ag, Pb, Au, Cu, Zn
Gen Supt: Warren Good
Mine Supt & Geol: Gordon V Klasen
No Prod

ST PAUL MINERALS
Gold Hill St Route, Sunshine
Pres: L W Tyrer
Sec & Treas: H C Tyrer
MINE, Gold Hill Mining Dist, undergr
No Prod

ST REGIS URANIUM CORP
2285 S Jackson St, Denver
Pres: E B Brannan
VP: Thomas Kassis
Treas: Neil Horan
Sec: T K Brannan
LONE PINE MINE, Montrose Co, undergr, U_3O_8, V_2O_5
Gen Mgr: E B Brannan
Mine Supt: Delbert Dyer, Lessee
Under devel

SAN JUAN MNG & DEVELOPING CO
480 S Lashley Lane, Boulder
Pres: Charles H Turner
VP: Philip F Icke
Sec: E H Dyas
Co operates as holding co:
SAN JUAN MINE, Ophir, leased to D Hunter, Telluride;
ESMERALDA PROP, Silverton, leased to Esmeralda Mng Co
Under devel

C C SANDERS DEVELOPMENT & MNG
Nucla
Opr: Calvin C Sanders
LONG PARK #8 & 12 MINES, undergr, U_3O_8, V_2O_5
Gen Supt: C C Sanders
Mine Frm: Ted Barnard
Prod: 30 tons

SEACOL INC
910 Greenwood, Canon City
MINE, U_3O_8

SHATTUCK DENN MNG CO
317 Main St, Grand Junction
Gen Mgr: Thomas W Newell
Gen Supt: Frank W Garrett
Geol: Carl W Appelin
Purch Agt: Jack D Hill
TOM BARDON MINE, Big Indian Dist, undergr, U_3O_8

SHATTUCK S W CHEM CO
c/o John B Saunders
1805 S Bannock St, Denver 23
MINE, pegmatites
Under devel

SHIPROCK INDUSTRIES INC
2000 Natl Bank of Tulsa Bldg, Tulsa 3, Okla
Pres: F T Anderson
VP: N B Gove
Sec-Treas: Don M Richards
MINE, Box 461, Boulder, undergr, WO_3
No Prod
(see N Mex)

SHIPROCK LTD
508 Continental Bldg
Dallas, Texas
MINE, U_3O_8

SILVER BELL MINES CO
633 Guaranty Bank Bldg
Denver 2
Pres & Gen Mgr: E H Sanders
VP: E J Nord
Sec: J W Metzger
SILVER BELL & CARBONERO MINE, Ophir, undergr Au, Pb Ag, Cu
Gen Supt: Lesley E Smith
No Prod

SILVER CREST MNG CO
Box 357, Crested Butte
Pres: R F Magor III
VP: R F Magor Sr
Sec: C F Henderson
Treas: John Wallace
MINE, open pit & placer, Au, Ag, Pb
Gen Mgr: R F Magor III
Gen Supt: Frank Hodgson
Mine Frm: Dick Kipp
Under devel
100-TON FLOT MILL, Crested Butte

SILVER LANE
Naturita
HIDDEN BASIN, CORP #1, RED ROCK MINES, west of Naturita, undergr, U_3O_8, V_2O_5
Gen Mgr & Supt: Max Wainscot
(Leased from Vanadium Corp of America)

SITTON & SITTON
Dove Creek
MINE, U_3O_8

SILVER MOUNTAIN MNG CO
5202 Ronald Rd, Peoria, Ill
Pres: D J Risser
VP: R G Hazzard
Sec: J M Risser
Treas: D J Risser
ALTA-ST LOUIS GROUP, Telluride, undergr, Au, Ag, Pb, Cu, Zn
Gen Mgr: D J Risser
No Prod

SKIDMORE MNG CO
Box 588, Delores
Pres: T H Skidmore
VP: G H Skidmore
LEGIN GROUP, undergr, U_3O_8 V_2O_5
Asst Gen Mgr: A L Skidmore
PARROT GROUP, undergr, U_3O_8, V_2O_5
Gen Supt: Chess Almond

E J SMALLER MNG
PO Box 769, Canon City
MINE, U_3O_8

SMITH & THOMPSON
Naturita
MINE, U_3O_8

CLINTON W SNYDER
PO Box 324, Paradox
MINE, U_3O_8

SOUTHERN & CALAHAN
8180 San Mateo Rd
Grants, N Mex
PARROT MINE, San Miguel Co, U_3O_8
No Prod

DALE SOUTHERS
Redvale
MINE, U_3O_8

SPRAY, EDWIN C
1537 Washington St, Denver
SWEET HOME MINE, Alma, Ag, Pb, Cu, Zn

STANDARD METALS CORP (formerly STAND URANIUM CORP)
Silverton
Pres: W B McCormick
Gen Supt: Robert Hurst
Ch Eng: R R Ward
Ofc Mgr: E A Larson
AMERICAN TUNNEL
Supt: Frank Siegfreid
SHENANDOAH MINE
Supt: John Holmgren
750-TON FLOT MILL, at Shenandoah Mine
Supt: Aldo Bonavida
MICAWBER MINE, Crested Butte, undergr, Pb, Zn, Au
Supt: Jack Dressel
(see Utah)

STERRY BROTHERS
Route 5, Grand Junction
ARROWHEAD NOS 23 & 24, Arrowhead Mesa, U_3O_8, V_2O_5

STRATTON CRIPPLE CREEK MNG & DEVEL CO
Box 178, Colorado Springs
Pres: A G Hill
Sec-Treas: Kenneth Brown
VP-Supt: James H Keener
MINES, under lease

SUNRAY MNG CO
2708 Highway 50 So
Grand Junction
CORVUSITE & PEGGY 1 & 2 MINES, Mesa and Montrose Counties, U_3O_8
(see Utah)

SUBLET MNG CO
Box 214, Creede
Gen Part: Paul J Snyder
HOLY MOSES #1, MINE, undergr Pb, Ag, Au, Zn
Gen Mgr: Paul J Snyder
No Prod
30-TON GRAVITY MILL, Mineral Co

SUPERIOR MINES CORP
Box 127, Salida
RAWLEY MINE, Saguache Co, Pb, Zn
Under devel

SUSQUEHANNA-WESTERN, INC
777 Grant St, Denver 3
Pres: Allen D Gray
VP-Treas: Wm H Hoadley
Purch Agt: P M Cheney
(see S Dak, Wyo)

SUTTON, O A
407 Insurance Bldg
Wichita, Kansas
B & B, AND BARON MINE, Summit Co, Au

SWEENEY, EARL G
1061 Grant, Boulder
50-TON FLOT-GRAV MILL, MAGNETIC & ELECTROSTATIC

Sugar Loaf Rd, Boulder
(formerly property of Wah Chang Corp)

TALL TIMBER MNG CO
c/o L R Hinman, 909 Grant St, Denver
MINE, near Indian Hills, open pit, feldspar, Be, mica
No Prod

TALLAHASSEE URANIUM CORP
Box 768, Canyon City
U_3O_8

THE TENDERFOOT MNG CO
818 17th St, Denver 2
Pres A L Metzner, Jr
Sec & Treas: K R Whiting
MINE, Cripple Creek, undergr
Au
No Prod

TEXAS ZINC MINERALS CORP
(subsid of New Jersey Zinc Co)
1129 Colorado Ave
Grand Junction
Pres. N K Banks
(see Utah)

THOMPSON, ART
Nucla
SESMO, DONNA K, DUSTY, ML 23 MINES, W of Naturita, undergr, U_3O_8, V_2O_5
(Leased from Vanadium Corp of America)

T E THOMPSON & STANLEY R JOHNSON
PO Box 197, Dove Creek
MINE, U_3O_8

THORNBURG MNG CO
140 W Main, Grand Junction
(See Utah)

THREE B MNG CO
Box 73, Victor
Own & Op. B O Bunner
HAPPY YEAR-SCOTT SHAFT MINE, N side Raven Hill at Midway, undergr, Au, Ag
Gen Mgr. B O Bunner
Asst Gen Mgr & Mech Eng: C A Bunner
Mine Eng: Charles Carlton
Under devel
J N HARDIN, HAPPY YEAR, JOSEPHINE, MOUNTAIN TIGER, UNEXPECTED, GOLD LEAF, BOGART, MARIA A, BOB TAIL, MUD HEN, & WEST END GOLD LEAF claims

TRACE ELEMENTS CORP (UNIT OF UNION CARBIDE NUCLEAR CO)
Maybell
MAYBELL MINE & MILL
Maybell, surface, U_3O_8
Gen Mgr: J L Lake
Mgr Mines: J F Emerson
Mgr, Adm: J F Brenton
Mgr, Plants: A C Sada
Mine Supt: A W Woods
Mine Frm. K Lambertson
Mill Frm: J E Massey
Mill Supt: D M Pembridge

TRANS MTN URAN CO & GLOBE HILL
217 Independence Bldg, Colorado Springs
MINE, U_3O_8
No Prod

TREASURE MOUNTAIN GOLD MNG CO
202 Midland Savings Bldg, Denver 2
Pres: Guy L V Emerson
Sec: A W Fischer
SAN DIAGO, SAN JUAN, QUEEN, GOLDEN FEEECE & SCOTIA MINES, 11 mi NW of Silverton, undergr, Au, Ag, Pb, Zn, Mn
No Prod

W D TRIPP MINING CO
Box 291, Dove Creek
CANFIELD MINES, Egnar, Colo, undergr, U_3O_8, V_2O_5
Gen Mgr: W D Tripp
Asst Gen Mgr: D Knuckles
Mine Supt: W D Tripp
Asst Mine Supt: D Knuckles
Prod: 15 tons daily
Under devel

TUNGSTEN MNG CO, INC
420 Pine St, Boulder
Pres & Treas: George W. Cowdery
VP & Treas: Wm D Cowdery
TUNGSTEN MINE, Boulder undergr, WO_3

TWIN STAR MINING CO
c/o Louis Smith, Meeker
MINE, U_3O_8
No Prod

UNION CARBIDE NUCLEAR COMPANY
(Div of Union Carbide Corp)
1600 Ute Ave, Grand Junction
Gen Mgr-Colo Plateau: J L Lake
Mgr of Plants. A C Sada
Asst Mgr, Plants. H K Jackson
Mgr Mines. J F Emerson
Asst Mgr Mines: J R van Fleet
Mgr, Admin: J F Brenton
Land Mgr. T S Ary
Mgr, Explor: W H Kohler
Mgr, Pub Relns: L E McCarty
Mine Eng, Research & Devel: J A Tavelli
Mgr of Eng: R C Olson
Mgr of Acct & Finance: C P Martin
Ch Geol: J E Motica
Ch Met: A W Lankenau
Eng, Radiation Control: R G Beverly
MINE & MILL, Uravan, undergr, U_3O_8, V_2O_5
Plant Supt: O J Malacarne
Mine Supt: J R Borden
Mill Supt: D G Millenbruch
MINE & MILL, Slick Rock, undergr, U_3O_8, V_2O_5
Mill Supt: O J Malacarne
Mine Supt: W W Witt
CHEMICAL MILL, Rifle
Plant Supt: F T Temple
Asst Plant Supt. J M Chandler
Mine Supt: A H Bebee
(See Calif, Nev, NY, Utah, Wyo)

THE UNITED GOLD MINES CO
PO Box 47, Victor
Pres: Merrill E Shoup
VP: Max W Bowen
Sec. Hazel Bates
Treas. John Jacobs, Jr
Purch Agt: C H Carlton
UNITED GOLD MINES CO MINE, Victor,
Gen Mgr: Max W Bowen
Gen Supt: C H Carlton
Mech Eng: George Lorenz
No Prod

U S BERYLLIUM CORP
306 Bon Durant Bldg, Pueblo
Pres: Donald H Peaker
BOOMER LODE MINE, Park Co, beryllium
(Lessees from Min Dale Mng Co)

U S GYPSUM CO
300 W Adams St
Chicago 6, Ill
QUARRY, Loveland, open pit, gypsum
Works Mgr: J R Miner
(See Calif, Conn, Ill, Ind, Iowa Mass, Mich, Mont, Ohio, New Mex, NY, Okla, Tex, Utah, Va)

U S LITHIUM CORP
1205 Walker Bank Bldg
Salt Lake City, Utah
BROWN DERBY & TUCKER MINES, Gunnison County, undergr, lepidolite, spodumene
Gen Mgr: Paul T Walton
(See Utah)

UNITED URANIUM CORP
409 Empire Bldg
430 16th St, Denver 2
Pres: Ray Fahnlender
VP: Edgar Payton
Sec-Treas R H Foster
HOT DRILL #11 PICO #1 MINES, undergr, Dove Creek, U_3O_8, V_2O_5
No Prod

URADOX MNG CO
Box 214, Montrose
RATTLESNAKE CLM MINE, Montrose Co, U_3O_8

URANIUM EXPLORERS SYNDICATE
645 Emerson St, Denver
Gen Mgr: J Bromfield
URANINITE, CORVUSITE claims in Mesa and San Miguel counties
Under devel

URANIUM INDUSTRIES, INC
523 Colorado Bldg, Denver
(See Utah)

UTZE LODE COMPANY
Box 500, Salida
Pres: Ed Brandt
VP: F Wallace Koster
Sec: Cliff Griswold
Treas & Purch Agt: Harold R Koster
MADONNA MINE, undergr, Au, Ag, Pb, Zn, Cu
No Prod

VALLEY MNG CO
Box 248, Moab, Utah
BLACK STREAK, Blue Mesa, U_3O_8, V_2O_5
BLACK JUMBO GROUP, Mesa U_3O_8
DEER RUN MINE, U_3O_8

VANADIUM CORP OF AMERICA
Durango
Chm of Bd: William C Keeley
Pres: G L Weissenburger
Sec: D A Shriver
Treas: L C Miller
DURANGO PERSONNEL:
Gen Mgr: Fred A Brinker
Mgr, Land, Exploration & Ore Buying: Page L Edwards
Adm Asst. D Ornelia
Gen Mine Supt: Robert L Anderson
Western Div Acct: D L Truesdell
MINES, Colorado Plateau, undergr open pit, V_2O_5, U_3O_8
Ch Geol: Ervin E Waulters
Safety Eng: R G Vesper
600-TON MILL, Durango
Plant Supt: L A Daniels
Asst Supt: B D Newland
Mech Supt: C T Newland
Mast Mech. C D Prior
Ch Met: E D Dickerman
Ch Chem. Wayne F Lowry
(see Ariz, N Mex, N Y, Utah)

VANADIUM QUEEN URANIUM CORP
PO Box 1674, Grand Junction
Pres: Don Danvers
Sec-Treas: Dick Harrison
VANADIUM QUEEN MINE, La Sal Creek, undergr, U_3O_8 V_2O_5
Res Eng: John I Schumacher
Prod: 25 tons
(oper under contract to Joe Pitts, 133 W Mesa, Grand Junction)

VILLA GROVE TURQUOISE MINE
Villa Grove
LODE, Saguache Co, turquoise

VOGEL MINE & EXPLOR CO
Box 3183, Amarillo, Texas
Purch Agt: Harold W Vogel
BLUE BONETT NO 5 MINE, Lake City, undergr, Au, Ag, Zn
bauxite
Gen Mgr & Mine Supt: Harold W Vogel
Asst Gen Mgr: Harold H Ham
Under devel
(see N Mex)

WARD & FEELEY
Lake George
MINE, U_3O_8
No Prod

WATTERS, MARION R
Rte 1, Dolores
MINING LEASE NO 30 MINE, San Miguel Co, U_3O_8

WELLMAN, NORMAN
Box 1901, Grand Junction
ARROWHEAD NO 21, Calamity Mesa, U_3O_8, V_2O_5
BLUE RIBBON INCLINE NO 3 U_3O_8, V_2O_5
YELLOW JACKET NO 16, U_3O_8, V_2O_5

WESTERN FELDSPAR MLG CO
Box 671, Salida
Sec-Treas: J W Magnuson
PLANT, near Salida, feldspar
Under Devel

WESTERN GOLD & URANIUM INC
Box 95, Grand Canyon, Ariz
RITO SECO MINE, San Luis, Au
No Prod
(see Ariz, Utah)

WESTERN NUCLEAR, INC
Executive Offc: Suite 1420, 1700 Broadway, Denver 2
Oper Ofc: 507 W Spruce St, Rawlins, Wyo
Pres. Robert W Adams
VP: W T Adams
Sec & Asst to Pres J A Larson
Treas. Charles I Brown
Cont: Fred W Roecker
Purch Agt: W L McFarland
(see Wyo)

WILD & FRANDSON
110 W 10 St, Loveland
RIDE AWAY LODE MINE, Masonville, Beryl

WILLIAMS MNG CO
757 Cottonwood, Canon City
Own: Glenn D Williams
WILLIAMS MINE, 33 mi W and N of Canon City (NW 1/4, Sec 36, 17 S, 73 W), undergr, U_3O_8
(mining performed under contract by Logan Shelhamer Canon City)

WILLIAMSON MNG CO
Box 431, Boulder
Pres & Gen Mgr. Harry B Williamson
VP: M W Colley
Sec: H W Looper
EMMETT-ARGO MINES, Jamestown, undergr, open pit
CaF_2, Au
Mine Supt. B D Lott
Mech Eng: A C Walker
Prod: 150 tons

WOODARD, CHARLES V & CO
2909 U S Hwy 50
Grand Junction
ZEE LEASE MINE, Gateway, U_3O_8, V_2O_5, undergr
Gen Mgr: Charles V Woodard
Gen Supt: Frank E Woodard
Prod: 30 tons

WORCESTER MINES
2512 Mira Vista Rd, Grand Junction
Mng Part: John W Hill
WORCESTER MINE, Uravan, undergr, U_3O_8, V_2O_5
Frm: Paul R Martin
Shift Boss: James Dees

WORKMAN, TIM & KENNETH
Uravan
OLD QUAKER, OLD QUAKER #3 FAWN SPRINGS #10, 7, 13, 4, 5, west of Naturita, U_3O_8, V_2O_5 undergr
(Leased from Union Carbide Nuclear Co)

YUBA DEVELOPMENT CORP
1129 Colorado Ave
Grand Junction
Pres: J L McGara
VP: F J Malott
Sec: A H Sy
Treas: L J Bos
Purch Agt & Cont: Troy E Wade
HIDEOUT MINE and others
(see Utah)

ZIMMERMAN, BEN
2940 1/2 F Road
Grand Junction
CALAMITY #10 SOUTH, #11 NORTH GILBERT MINES, W of Naturita, undergr, U_3O_8, V_2O_5
(Leased from Union Carbide Nuclear Co)

ZINGHEIM, MRS EE
1427 River St, Canon City
DEVILS HOLE MINE, Fremont Co, pegmatites
No Prod

CONNECTICUT

EUREKA FELDSPAR MNG & MLG CO, INC
Davis Hill Rd, Portland
MINE, open pit, feldspar
MILL

FELDSPAR CORP, THE
PO Box 69, Middletown
Pres: N Cleaveland
VP: F S Miller, C Rogers Jr
Sec-Treas. G N Blevins
Gen Mgr: Blaine C Miller
Geol: Robert Halloway
MINE, open pit, feldspar mica, silica
Mine Supt. Lance Crowder
1,000-TON FLOT MILL, under const, prod anticipated by summer 1961
Mill Supt. Ernest Harrison
(see Ga, N C Tenn)

NEW ENGLAND LIME CO
Daisy Hill Rd, Canaan Village
MINE, open pit, dolomite, Ca, Mg

NUTMEG MNG CORP
Borden Bldg, Lakeville
Pres: Arthur P Levine
VP: Charles Citelli
Sec-Treas. Frank R Hurlbutt
MT PROSPECT, OLD POOL MINES, Bantam, undergr, Ni Cu
Explor only

OTTAWA SILICA CO
LANTERN HILL MINE, North Stonington, open pit, silica

U S GYPSUM CO
300 W Adams St
Chicago 6, Ill
FALLS VILLAGE MINE, Falls Village, open pit, limestone
Works Mgr. C P Svehla
(see Calif, Colo, Ill, Ind, Iowa, Mass, Mich, Mont, N Mex, N Y, Ohio, Okla, So Dak, Tex, Utah, Va)

WORTH SPAR CO
Cobalt
Pres. James Stevens Jr
MINE, open pit, feldspar

DELAWARE

E I DU PONT de NEMOURS & CO
Pigments Dept, 1007 Market St, Wilmington, Delaware
(see Fla)

FLORIDA

AMER AGRI CHEM CO, THE
100 Church St, New York 7, NY
PHOSPHATE ROCK MINES, Pierce, Polk Co, open pit, phosphate rock
Gen Mgr: F R Bergquist
Gen Supt J S Gruel
Geol: R D Evans
Mech Eng: H R Quina
Met: R D Evans and H W Breathitt
Elec Eng: C R Rowand
Mine Supt: N M Faulds
Asst Mine Supt: H C Cravey & F W Cook
Mine Eng: T J Anderson, Jr
(see N Y)

AMERICAN CYANAMID CO
30 Rockefeller Plaza
New York 20, N Y
Pres: Dr W G Malcolm
Exec VP: K H Klipstein
VP: G W Russell
Sec: R S Kyle
Treas: G C Walker
Dir Purch: K H LaRowe
Gen Mgr, Agric Div: C D Siverd
PHOSPHATE OPERATIONS, Brewster
Mgr Phosphate Opr: Arthur Crago

Asst Mgr: M W Chesson, Jr
Mines Mgr: E M Haynsworth
Asst to Mines Mgr: U K Custred
Mine Supt, Orange Park:
F A Vogler
Mine Supt, Sydney Mine:
D L Finger, Jr
Met: H F Wyncoop
Tripple Superphosphate Mgr:
C L Eisenhart
Asst Mgr R W Heinz
Plant Supt: M S Lassiter
ORANGE PARK & SYDNEY MINES, Brewster open pit, phosphate
Prod: 24,000 cu yds matrix (ore) both mines
6,500-TON FLOT MILL, Brewster (both mines)
TRIPLE SUPERPHOSPHATE PLANT, Now undergoing expansion to 200,000 tons per year phosphoric acid (P_2O_5)
(see Ark, Ga, Va, NY)

ARMOUR AGRICULTURAL CHEMICAL CO
Box 1685, Atlanta, Ga
ARMOUR MINE, Bartow, phosphate, open pit
FLOT MILL, Bartow
(see Tenn)

E I DU PONT de NEMOURS & CO
Pigments Dept, 1007 Market St, Wilmington, Del
HIGHLAND PLANT, (office) Drawer A, Lawtey, &
TRAIL RIDGE PLANT, (office) Drawer 753, Starke
HIGHLAND PLANT, 1 mi E of Lawtey, open pit, ilmenite, zircon, staurolite
Gen Mgr: Charles R Hager
Prod Supt: A D Vincent
Maint Eng: Frank Ilgen
Plant Tech: J L Hetherington
Mine Supt: W C Corar
Prod: 20,000 tons
TRAIL RIDGE PLANT, 6 mi E of Starke, (Camp Blanding) open pit, ilmenite, zircon, staurolite
Gen Mgr: Charles R Hager
Prod Supt: E M Conneen
Maint Eng: D M Pater, Jr
Plant Tech: J F Mulling
Mine Supt: V A Nichols
Prod: 20,000 tons
20,000-TON GRAV MILL, electrostatic
Mill Supt, Highland:
E V Widegren
Mill Supt, Trail Ridge:
H A Nelson, J L Chitty
(see Del)

EDGAR PLASTIC KAOLIN CO
Edgar
Pres: Albert C Edgar
VP, Sales: Allen C Edgar
VP, Prod: G E Davis, Jr
Treas & Prod Supt: G J Lane
MINE, open pit

THE FLORIDA MINERALS CO (DIV OF HOBART BROS CO)
Box 1597, Vero Beach
Pres & Gen Mgr: N W Van Ausdal
VP: Wm Hobart, Jr
Sec: Lowell Isenbarger
Treas: B A Lutz
Purch Agt & Gen Supt:
Sterling Dangler
MINE, Winter Beach, open pit, rutile, zircon, ilmenite
FLOT-GRAV MILL, at mine
Prod: 15,000 tons per yr
MINE, Brevard Co, open pit, rutile, ilmenite, zircon
Prod: 70 tons
(see Continental Mineral Co, Ohio)

FLORIDIN CO
(owned by Pennsylvania Glass Sand Corp)
Tallahassee
Pres: D H Mowell
VP: Wm J Woods, Sr, J W Moore, Wm J Woods, Jr, L C Gilson
Sec-Treas: C O Koebley
QUINCY PLANT, Box 510, Quincy, surface, fuller's earth
Plant Mgr: A D Sapp
Asst Plant Mgr: S L McCall
JAMIESON PLANT, Jamieson
No Prod
CHESEBROUGH, MARVIN OWENS, FRANK SMITH #1, D OWENS MINES

W R GRACE & CO, DAVISON CHEMICAL DIV
Florida Phosphate Opr
Box 471, Bartow
Mgr: W R Fort
Asst Mgr: J D Clary
Mgr Prod Plan: J L Hunter Jr
Purch Agt: W W Thornton
Ch Chem: J T Brent, Jr
Ch Eng: A J Frost
Asst Ch Eng: W R Rogers
Elec Eng: J C O'Neal
Geol: E R Scharar
Project Eng: C H Greene
Field Eng: T L Kelson
Mines Plan: M P McArthur
Safety Sup: J D Phillips
Gen Mines Supt: B P Jones
Phosphate Rock Maint Supt
E J Purcell
Gen Chem Supt: R W Biddle
Triple Plant Supt: D L Brooke
Triple Plant Maint Supt
D W Flagler
Process Eng Triple: C G Olsen
Process Eng Phos Rock:
C H Witz
BONNY LAKE MINE, Bartow, open pit, phosphate
Recovery Supt: W A Allen
BARTOW DRY MILL, Ridgewood
Supt: L L White
(see Md)

HUMPHREYS MNG CO (DIV OF HUMPHREYS ENGINEERING CO)
PO Box 5462, Jacksonville 7
Pres: A E Humphreys
VP-Gen Mgr: E C Weichel, Jr
VP: J P Wood, Frank McKinley
JACKSONVILLE PLANT, 6 mi E of Jacksonville, placer, ilmenite, rutile zircon, monazite
Plant Supt. Homer Lewis
Prod Supt: A D Whisler
Plant Eng: J H Elledge
Purch Agt: S L Jackson
Mine Eng: R M Lewis
Mill Supt: L A Gray
Mine Supt: V D Mathews
Maint Supt: C J Bastedo
(Plant operated for National Lead Co)
(see Colo)

INTERNATIONAL MINERALS & CHEMICAL CORP
Old Orchard Rd, Skokie, Ill
Pres: Louis Ware
VP: Franklin Farley
Sec: J H Hunt
Treas: R P Resch
VP, Phosphate Minerals Div:
Geo W Moyers
PHOSPHATE MINERALS DIV, Box 867, Bartow,
Gen Mgr, Phosphate Oper:
Floyd B Bowen
Phos Min Div Mgr: E T Casler
Mgr, Phosphate Mine Oper:
Colin A Campbell
Mgr Phosphate Plant Exp Prog:
J L Cox
Asst Mgr (Prod): H T Loehr, Jr
Asst Mgr (Eng): W O McClintock
MINE #122, 4 mi SE of PO at Mulberry, phosphate rock
ACHAN MINE & WASHER, 4 mi SW of PO at Mulberry, wet phosphate rock
PEACE VALLEY MINE, 3 mi N of Ft Meade
No Prod
NORALYN MINE, 5 mi SW of Bartow
(see Ariz, Ill, Maine, Miss, N Mex N C, S D, Tenn, Va, Wyo)

KELLOGG CO
PO Box 665, 920 Franklin St, Ocala
PHOSPHATE MINE

KIBLER-CAMP PHOSPHATE ENTERPRISE
Box 608, Ocala
Treas: Taylor Scott
Purch Agt: T D Felton
SEC 20 MINE, Dunnellon, open pit, hard rock phosphate
Gen Mgr: D B Kibler, Jr
Asst Gen Mgr: Clarence Camp II
Gen Supt: T D Felton
Mine Supt: N T Farrell
Prod: 300 tons

LONCALA PHOSPHATE CO
Box 338, High Springs
Pres & Gen Mgr: Sam Kelly
VP: Chas A Savage
Sec-Treas: J H Hill
MONA MINE, 3 mi W of Newberry, soft phosphate with colloidal clay
Gen Supt: Barney Floyd
FT WHITE MINE, Lake City Junction
PLANTS, at mine

MAGNET COVE BARIUM CORP
Box 6504, Houston, Texas
MINE, Hinson, open pit, fuller's earth
MILL, 300 tons dry grind
Div Mgr: C L Wilkinson, Jr
Plant Mgr: W C White
Prod Mgr: C F Talbot
(see Ark, Mo, Nev, Texas Wyo)

MINERALS & CHEMICALS PHILIPP CORP
Menlo Park, N J
WILLACOOCHEE MINE, Gadsden Co, clay, fuller's earth
Supt: Arthur Holder
LACAMELIA MINE
PLANT, Attapulgus, Ga
(see Ga, N J)

SMITH DOUGLASS CO, INC
Box 790, Plant City
VP: R S Rydell
Sec: W R Mowen
Purch Agt: R R Hicks
TENOROC MINE, 7 mi NE of Lakeland, Polk County near Auburndale, open pit, phosphate rock
Gen Mgr: R M Wilbur
Adm Asst: B V Galloway
Dir. Research:
C A Hollingsworth
Ch Eng: E G Padgett
Ch Chem: D B Underhill
Mine Supt: L G Wood
Mine Eng: Donald Morrow

SOIL BUILDERS, INC
Box 368, Dunellon
MINE, phosphate rock

SUN PHOSPHATE CO
Dunellon
MINE, phosphate rock

SUPERIOR PHOSPHATE CO
Box 476, Dunnellon
Pres: Bonnie E Roof
VP: R D Roof
Sec: W R Smith
BAR MINE, Citrus Co, phosphate clay
Supt: J H Roof
DUNNELLON MINE, 1/2 mi N of Dunnellon in Marion Co, phosphatic clay
Supt: R D Roof

SWIFT & CO
PO Box 208, Bartow
WATSON & VARN MINES, near Fort Meade, open pit, phosphate
Gen Mgr: H P Gould
Gen Supt: O D Bowers
Mech Eng: W B Hunt
Elec Eng: H K Young
Mine Supt: J B Rant
Asst Mine Supt: E E McKinney
C W Justice
Prod: 8,500 tons
AGRICOLA FLOT PLANT
(see Ill)

TITANIUM ALLOY MFG DIV, NATIONAL LEAD CO
111 Broadway, New York 5, NY
MINE, ilmenite, rutile
(see National Lead Co, Ark, Calif Colo, La, Mo, Mont, Tenn, Tex, Utah, Wyo)

UNITED CLAY MINES CORP
Hawthorne
MINE NO 4, open pit, kaolin, glass sand
Mine Supt: L F Worley
MILL, at mine
(see Ga, Md, N J, S C, Tenn)

VIRGINIA-CAROLINA CHEM CORP
FLORIDA MNG DEPT
Nichols
Mgr: H L Pascoe
Asst Mgr: C V O Hughes
Opr Mgr, Mng Div:
A A Farrell
HOMELAND MINE, 2 mi E of Homeland, phosphate
Supt: E E Brower
PHOSMICO MINE, 3 mi E of Barton, phosphate
Supt: W R Cullop
CLEAR SPRINGS MINE, 3 mi EW of Barton
10,000-TON FLOT MILL
(see Tenn, Va)

GEORGIA

ALBEA YORK MNG CO, INC
Box 356, Cedartown
Pres & Gen Mgr: S B Albea, Sr
VP: Glenn T York, Sr
Sec: Glenn T York, Jr
Asst Gen Mgr & Treas:
S B Albea, Jr
Purch Agt: S B Albea, Jr & S B Albea, Sr
OREMONT MINE, open pit, Fe
Gen Supt: Joe Allen Baker Jr
Mine Eng: S B Albea Jr
Prod: 200 tons
CANTON MINE, Canton, 500-TON HEAV MED MILL, Oremont
No Prod

AMERICAN CYANAMID CO
PO Box 55, Adairsville
Mgr: A W Montgomery
NEW HOLLAND MINE, Hermitage, open pit, bauxite
CAVENDER & THIGPEN MINE, Andersonville, open pit, bauxite
Gen Mgr: A W Montgomery
Geol: Dr H E Cofer, Jr
Supt of Mng: E W Renshaw
MILL, Adairsville
(see Ark Fla N Y Va)

AMERICAN TALC CO
Chatsworth
Pres: M W Glenn
VP: F T Glenn
Sec: J B Ferry
SHOP TUNNEL, 3 mi E of Chatsworth, talc, soapstone
Prod: 200 tons
Mine Supt: Garvin Swanson
250-TON MILL, Chatsworth
Mill Supt: James Johnston
Mill Frm: Walt Weaver
(see Ala)

APPALACHIAN MINERALS CO (SUBSID OF PACIFIC TIN CONSOL)
PO Box 191, Monticello
VP & Gen Mgr: C P Rogers, Jr
Treas: G N Blevins
Plant Mgr: T L Willis
MINE, Monticello, open pit, feldspar
Gen Supt: R W Hughes
Geol: L L McMurry
Met: J Philip Neal
Mine Frm: Rudolph Boone
Prod: 200 tons
200-TON FLOT MILL, Monticello
Mill Supt: Herbert Hickey
Asst Mill Supt: Aubie McMichael

BESTWALL GYPSUM CO
Savannah
Pres: R G Lizars
PLANT, gypsum
(see Iowa, Kans, Mich, N Y, Pa, Tex, Utah)

CHAMPION PAPER & FIBRE CO
601 N B Street, Hamilton Ohio
MINE & PLANT, kaolin, Sandersville
(see Ohio)

COHUTTA TALC CO, THE
Chatsworth
Pres & Purch Agt:
M Woodard Glenn
VP: L B Farrar
Sec & Treas: S A Farrar
MORT MINE, 7 mi E of Chatsworth, undergr, talc & soapstone
Gen Supt: Robert Ensley
Prod: 100 tons
100-TON MILL, Chatsworth
Mill Frm: C M Young

EVANS CLAY CO
Cartersville
MINE, kaolin
PLANT, McIntyre

FELDSPAR CORP, THE (Appalachian Minerals Co)
Monticello
MINE, open pit, feldspar
Gen Mgr: Carroll Rogers, Jr
Mgr. T L Willis
Gen Supt: R W Hughes
Eng: L L McMurray
Chem: Donald Polk
FELDSPAR 1000-TON FLOT MILL, at mine
Mill Supt: H M Hickey
(see N C, Tenn, Conn, Ga)

FUNKHOUSER MILLS, THE
Div of Rubberoid Co
Hartwell
MINE, Mica
Plant Mgr F C McConnell

GENERAL REFRACTORIES CO
1520 Locust St, Philadelphia 2, Pa
MINE, kaolin
PLANT, Stevens Pottery
(see Ind Pa)

GEORGIA KAOLIN CO
433 N Broadway Elizabeth, N J
MINE, kaolin
2 PLANTS, Dry Branch
(see N J)

GEORGIA MARBLE CO, CALCIUM PROD DIV
Tate
Pres: John W Dent
Gen Mgr: Wm B Tate Jr
Purch Agt: T M Shaw
MEW YORK MINE, Tate, undergr, limestone
Mine Supt. H HBuchanan
MechSupt J D Ragsdale
Prod: 1200 tons
1200-TON SCREEN, WET & DRY MILLS(5)
Mill Supt: J B Jones, Loy Hammondtree

GEORGIA TALC CO
Chatsworth
Pres: M Woodard Glenn
MINE, Talc

HODGE MNG CO
116 W Cherokee Ave
Cartersville
Own: J W Hodge
Sec: M T Shaw
HODGE MINE, 14 mi W of Cartersville, Fe
Supt. Clyde Shaw
Prod: 575 tons
MINE, Bartow County, surface, Fe

J M HUBER CORP
630 3rd Ave, New York 17, N Y
MINE, kaolin
PLANT, Huber
(see N Y)

LIBERTY GOLD MINE
3520 Blair Circle, NE, Atlanta 19
Own & Op: Leonard Markun
LIBERTY MINE, Sugar Hill, undergr, Au, Ag
Under devel
35-TON FLOT GRAV MILL, at mine
No Prod

MINERALS & CHEMICALS PHILIPP CORP
Menlo Park, N J
KAOLIN MINES, Gardner, McIntyre, Wilkinson & Washington Co, open pit
Mgr: A C Todd, Jr
PLANTS, Attapulgas & Gardner
(see Fla, N J, Va)

NATIONAL GYPSUM CO
Savannah
MINE, Gypsum
(see N Y)

NEW RIVERSIDE OCHRE CO
Box 370, Cartersville
Mng Part. J R Dellinger
Gen Mgr: W B Hawkins, Jr
MINE, River Road, open pit, barite, ochre
Gen Supt: John H Cobb
Mine Supt: Cecil Gullins
Prod: 60 tons
80-TON FLOT-GRAV MILL, at mine

PAGA MNG CO
Cartersville
Supt: A O Franz
MINE, Cartersville, barite

POWHATAN MNG CO
6721 Windsor Mill Rd
Baltimore 7, Md
Pres: Fred A Mett
GAY & CORNELIA MINES, Dillard, asbestos
Supt: H M Pitts
(see Md)

SOUTHERN CLAYS, INC
33 Rector St, New York 6, N Y
PLANT, Gordon, kaolin
(see N Y)

SOUTHERN TALC CO
Box 278, Chatsworth
Pres: M Woodard Glenn
MINE, Chatsworth, talc

UNITED CLAY MINES CORP
Sandersville
MINE NO 5, open pit, kaolin
Mine Supt: W J Smith
Asst Supt: Roger M Carlson
MILL, at mine, water washing & dry plants
(see Fla, Md, N J, S C, Tenn)

WILLINGHAM LITTLE STONE CO (DIV GEORGIA MARBLE CO)
316 Healey Bldg, Atlanta
MINE, whitestone (large undergr opening) dolomite

IDAHO

ABERDEEN IDAHO MNG CO
510 Bank St, Wallace
ABERDEEN-IDAHO GROUP, Shoshone Co, Ag, Au, Cu, Pb, Zn
Under devel by the Bunker Hill Co

ABOT MNG CO
Box 1010, Wallace
Pres: Rollin Farmin
Sec: R W Anno
MINE, undergr, Pb, Ag
Under devel

ADELMANN BROS MINES GROUP
622 Idaho St, Boise
Sec-Purch Agt: C F Adelmann
IDAHO SORREL HORSE, BLUE GROUSE & EXTS, undergr, Au Ag
Geol-Elec Eng: Wm A Adelmann
Mech Eng: J P Adelmann
Met: A G Adelmann
24-TON GRAV MILL, Black Hornet mng dist
Mill Supt: J P Adelmann
No Prod

AGENCY CREEK THORIUM & RARE METALS CORP
Salmon
Pres & Mgr: J R Goggins
Sec: C J Moore
Agent: P W Franks
MINE, Tendoy
(under devel by Rare Metals Corp of America)

ALICE SILVER LEAD MNG CO
Box 469, Wallace
VP: C A Tilford
Sec-Treas: H F Magnuson
No Prod

AMERICAN MNG CORP
450 S Main St, Salt Lake City, Utah
Pres & Mgr: Raymond E Sherwood
Sec: Earl J Knudson
Agt: Robert H Remaklus
SMITH CREEK GRP, Yellow Pine dist, Yellow Pine, placer, Au

AMERICAN SILVER MNG CO
123 W 4th Ave, Spokane, Wash
VP: J M Henneek
Sec-Treas: L B Conrad
MINE, 1 mi S of Osburn, undergr Cu, Au
Under devel by Hecla Mng Co
(see Wash)

AMERICAN SMELTING & REFINING CO, N W MNG DEPT
Box 440, Wallace
Mgr: J C Kieffer
Ch Acct: W J Murphy
Ch Geol: P I Conley
Ch Eng: R F Pettit, Jr
Supt of Mines, W J Coombe
Supt of Mills, G A Deshler
Elec Supt: A W Beck
Mech Supt: S W Ward
Purch Agt: J P Polla
PAGE MINE, Pb, Zn, Ag
Supt: T M Tower
Asst Supt: C J Ward
Frm: Al Young, Richard James
MORNING MINE, undergr, Pb, Zn, Ag
Mine Supt: H H Shook
No Prod
JACK WAITE MINE, Duthie undergr, Pb, Zn, Ag
Supt: C H Blackwill
Frm: H F Legault
240-TON MILL, concentrator
(Operated under agreement with Jack Waite Mining Co)
GALENA UNIT, 3 mi W of Wallace, undergr, Ag, Pb
Supt: Norman Vianes
Asst Supt: G B Christian
Mine Frm: E Lomas
350-TON MILL, concentrator
Mill Frm: M Hopkins
(see Callahan Mng Corp)
(see Ariz, Calif, Colo, Ill, Md, Mont, Nebr, Nev, N J, N Mex, N Y, Tex, Utah, Wash)

ANDERSON, ED
Clark Fork
LAWRENCE MINE, Bonner Co, Au, Ag, Cu, Pb, Zn

ATLAS MNG CO
Mullan
Pres & Mgr: R W Greenough
Sec: H J Hull
MINE, undergr, Pb, Ag, Cu, Zn
No Prod

AUSTIN-MEYER CORP
642 Peyton Bldg, Spokane 1, Wash
WEBER MINE, Bonner Co, Au Ag, Cu, Pb, Zn

BAD BEAR MINE
c/o Frank J Clement, Gen Del, Idaho City
BAD BEAR MINE, Boise Co, Au, Ag, Cu, Pb, Zn

BANNER-IDAHO MINES INC
Scott Bldg, Wallace
Pres: John Davis
VP: C W Hentley
Sec-Treas: J W Coumerilh
Asst Sec: H F Magnuson
No Prod

BAYHOURSE MINES, INC
Challis
MINE, undergr, Ag, Pb
(Property leased from Ramshorn Mines Co, Salt Lake City, Utah)
No Prod

BELL, DAVID E
Mackay
EMPIRE COPPER MINE, Custer Co, Au, Ag, Cu, Pb, Zn

BEN HUR GOLD, INC
Box 2853, Boise
Pres & Mgr: E C Heffner
Sec: E M States
MINE, Idaho City
MILL, 10-ton development
No Prod

BLACK BEAR SILVER LEAD MINES, INC
Box 847, Wallace
Pres: Geo F Ringel
BLACK BEAR GROUP, near Gem, Shoshone Co, Ag, Pb, Zn, Cu
(Leased from Black Bear Mines Co & being developed by Metropolitan Mines Corp)

BRADLEY MNG CO
660 Market St, Rm 515, San Francisco, Calif
YELLOW PINE MINE, undergr & open pit, WO_3, Sb, Au, Ag
No Prod
(MA MINE, Patterson, undergr WO_3, Ag, Cu, Pb
No Prod
(see Calif)

BUDOCK, GEORGE
2118 S Kimball, Caldwell
MINE, Cambridge, Fe

BUNKER CHANCE MNG CO
128 Cypress St, Wallace
Pres: John F Petrinovich
Sec: Mary M Petrinovich
Mgr: Ted Schindler
MINE, Yreka dist, Wardner, undergr, Pb, Ag, Cu

BUNKER HILL CO, THE
Box 29, Kellogg
Pres: Chas Schwab
VP: H E Lee, R H Cutting
VP & Sec: D L Feathers
Treas: Emmett G Solomon
Purch Agt: Gilford Mayes
Cont: B N Ramstedt
Mgr, Empl & Pub Rel: B F Mahoney
Mine Mgr: Jos Gordon
Ch Geol: R H McConnel
Mgr, Plant Ser: L M Griffith
BUNKER HILL & CRESCENT MINES, undergr, Pb, Ag, Zn
Mine Mgr: Joe Gordon
Mine Supt: E B Olds
Asst Mine Supt: Chas Hathhorn
Ch Mine Chem: Irving Laskey
Mine Frm: Paul Sloan, Don Wilson, Bob Riley, Frank Huston
Ch Mine Eng: Austin Park
Mine Maint Supt: Lee Vance
Prod: 1,800 tons
2500-TON FLOT CONCENTRATOR, Kellogg
Mill Supt: Norman J Sather
Mill Frm: Paul Tietze
LEAD SMELTER, Kellogg
Mgr of Met: A Y Bethune
Supt: George Dunn
Asst Supt: Donald Ingvoldstad
Smelter Maint Supt: Tom Tapper
Ch Chem: L W Burgess
Ch Research Met: K K Kirkpatrick
Prod: 100,000 tons yrly
ELECTROLYTIC ZINC PLANT, Kellogg
Supt: Walt Schmittroth
Asst Supt: Sam Keller
Maint Supt: C H Neubauer
Ch Research Met: Gregory Popoff
Ch Research Chem: Leo Baumeister
Prod: 72,000 tons
STAR MINE, Burke (Operated by contract by Hecla Mng Co)
RED BIRD MINE, Clayton, undergr, Pb, Ag
(see Calif, Wash)

CACHE CREEK MNG CO
2403 So Tacoma Way
Tacoma, Wash
Pres: H G Nickelsen
VP: C E Bonnell
Sec: C W Whitaker
GOLDEN HAND MINE, Big Creek, undergr & placer, Au, Ag
No Prod

CALLAHAN CONSOLIDATED MINES, INC
Scott Bldg, Wallace
Pres: George M Brismer
Sec: H F Magnuson
MINE, Placer Center dist, Wallace, Ag, Cu, Pb
TEMPLE GRP, Lelande dist, Shoshone Co

CALLAHAN MNG CORP
100 Park Ave, New York 17, N Y
GALENA MINE, Wallace, undergr, Ag, Cu
Prod: 500 tons per day
(Leased to Amer Smltg & Refin Co)
(see N Y)

CAMAS URANIUM MNG & DEVEL CO
Gooding
Op: Donald F Vaught & Lowell Fields
20 CLAIMS, Little Smoky Dist, Camas County, undergr, Au, Ag, Pb, U_3O_8
Under devel

CENTRAL FARMERS FERTILIZER CO
Georgetown
Pres: J J Lanter
VP: G W Bunting
Sec-Treas: Ed Rennhack
Purch Agt: Louis Quiram
IDAHO PHOSPHATE WORKS, Georgetown, open pit, phosphate
Gen Mgr: W T Tillotson
Gen Supt: Donald Anderson
Geol: Don Bartschi
Elec Eng: Kenneth Freeman
Asst Mine Supt: David Hand
Mine Frm: Duane Johnson, Robert Solum
Mine Eng: Neil Smith
MILL, Georgetown
Mill Supt: Dale Williams
Mill Frm: Walter Hirsbrunner
ELECTRIC FURNACE, Georgetown
Supt: Loyal Phillips

CHAMPION MINE
Box 61, Mackay
Own-Mgr: J L Austich
MINE, 8 mi S of Mackay, undergr, Pb, Cu, Ag
No Prod

CHESTER MNG CO, LTD
Wallace
Pres & Mgr: L J Randall
Sec: D W Morehouse
MINE, Pb, Ag, Cu
No Prod

GLEN CLARK TRUCKING
736 W Galloway, Weiser
Own: Glen Clark
CAMPBELL MINE, Warm Creek
30 mi from Weiser, Fe
Prod: 4,000 tons yrly

CLAYTON SILVER MINES
Box 890, Wallace
Pres: W M Yeaman
VP: John Preissner
Sec-Treas: Ray Morrison
MINE, Clayton, undergr, Pb, Ag, Zn
Gen Mgr: Norman M Smith
Gen Supt: R J Legard
Elec Eng: Dick Settles
Mine Supt: Fred Leuzinger, J
Prod: 100 tons
100-TON FLOT MILL

CLEARWATER MINES, INC
401 Empire State Bldg
Spokane, Wash
Pres & Mgr: H G Loop
Sec: E I Fisher
Agent: Norman Ross
MINES, undergr Cu, Pb, Ag, Au, Shoshone Co
(see Wash)

COEUR D'ALENE MINES CORP
203 Gyde Taylor Bldg
Wallace
Pres: H C Mowery
Sec: W A Callaway
MINERAL POINT MINE, Osburn, 1 mi S of Osburn, Ag Cu
Under devel
(Operated by Polaris Mng Co)
600-TON FLOT MILL

COEUR D'ALENE SILVER GIANT, INC
Box 838, Kellogg
Pres & Gen Mgr: Harry G Alway
Sec-Treas: C Whalen
MINE, E Fork of Big Creek, Kellogg, Ag, Pb
No Prod
82 LODE CLAIMS, Shoshone Co, under working contract

COME-BACK MNG CO
Idaho City
Pres: Joseph E Gornick
VP: Frank E Lunka
Sec-Treas: Louis F Truger
COME-BACK MINE, Pioneerville, undergr Au, Ag, Pb, Zn, Cu
Gen Mgr: Louis F Truger
Under devel

CONJECTURE MINES, INC
326 Wiggett Bldg
Coeur d'Alene
CONJECTURE MINE, Lakeview Lndg via Bayview, undergr, Ag Pb, Zn, Cu, Au, Sb
(Under devel by Federal Resources Corp)
(see Wash)

COPPER CAMP CO
2721 Rose Hill St, Boise
Pres: C A Ray
Sec: D H Peterson
MINE, Valley Co, undergr, Au, Ag, Cu
Under devel

CORDERO MNG CO
131 University Ave, Palo Alto, Calif
VP: S H Williston
Gen Mgr: J Eldon Gilbert
WILD HORSE MINE, Mackay, 35 mi W of Mackay, undergr, Cu, WO_3
Asst Gen Mgr: V P Haas
Gen Supt: Edward Hager
No Prod
50-TON GRAV MILL, at mine
(see Calif, Nev, Alaska)

CORTEZ SILVER-LEAD CORP
523 W 6th St, Los Angeles Calif
Pres: Kenneth Lieber
Sec: Leroy A Garrett
Agt: Platt Hull
CORTEZ SILVER-LEAD GRP, Hunter dist, Mullan, Ag, Pb, Zn
Under devel

DAY MINES, INC
Box 1010, Wallace
Pres: Henry L Day
VP: Wray D Farmin
Sec: Norville K Bue
Treas: R W Anno
Purch Agt: G T Kelton
Mgr of Mines: Rollin Farmin
DAYROCK, MONITOR, TAMARACK, HERCULES MINES, Wallace, undergr, Pb, Ag, Zn, Au, Cu
Gen Supt: C E Sparks
Geol: G M Crosby
Mech Eng: R H Giles
Prod: 100 tons
4 FLOT MILLS
2 MILLS
No Prod

DELMAR MNG & MLG CO
N 5018 Lincoln
Spokane 19, Wash
Pres: Norman E Mills
VP: Odolph Okert
Sec: Harry O Klaus
MINE, Salmon, undergr, Au, Ag
Mine Supt: Irvin Erickson
Under devel
25-TON GRAV MILL, at mine
(see Wash)

DONMAR GOLD MINES
3 Harbor Drive, Corte Madera, Calif
Own: Donald & Marjorie Bennett
DONMAR GOLD MINES, 17 CLAIMS, 1 Wallula Street, Idaho City, undergr, open pit, placer, Au, Ag
Under devel

DOUGLAS MNG CO
PO Box 29, Kellogg
VP: W G Woolf
Sec: Robert E Brown
DOUGLAS MINE, (McLin Lease) Pine Creek, 13 mi SW of Kellogg, Pb, Zn, Ag

EAGLE TALON MINES
c/o Donald L Elmquist, 1800 Mt View Drive, Boise
EAGLE TALON GROUP, Gem County, Au, Ag, Cu, Pb, Zn

E-DAH-HOW URANIUM INC
Box 646, Salmon
Pres, Mgr & Agent: W W Lowe
Sec: P N Shockey
MINE, U_3O_8
No Prod

ESPERANZA GOLD DIKES MNG CORP
7098 SE 27th, Portland, Ore
Pres: M G Johnson
Sec: A R Johnson
IDAHO CHAMPION MINE, Orogrande Dist, undergr, open pit, Au
No Prod

ESTES GOLD MINES, INC
318 Idaho Bldg, Boise
Pres: Harvey Evans

Sec: Peter Scherer
MC FADDEN GRP, Yankee Fork dist, Mackay, undergr, Au, Ag, Cu, Pt
50-TON BALL MILL

EUREKA SILVER KING MINES CORP
516 First Natl Bank Bldg, Boise
Pres, Mgr & Agt. John E Dolan
Sec· Spencer C Barrett
MINE, Warm Lake, undergr, Ag, Pb, Au

FEDERAL RESOURCES CORP
1370 S 3rd West St
Salt Lake City, Utah
CONJECTURE MINE, Lakeview Landing via Bayview, Bonner County, undergr, Au Ag, Cu, Pb, Zn
Gen Mgr· R W Neyman
Asst Gen Mgr: L R Messerly
Gen Supt Walter Campbell
Geol-Ch Eng: A B Newman
Under devel
(Joint ownership with Conjecture Mines, Inc)
(see Utah, and Idaho Lakeview Mines Co, Idaho)

FERN MNG CO
Day Bldg, Wallace
Pres & Mgr. H L Day
Sec: R W Anno
MINE

FISHER, ALFRED V
Clayton
SILVER BELL MINE, Custer County, Au, Ag, Cu, Pb, Zn

FOOD MACHINERY AND CHEMICAL CORP, MINERAL PRODUCTS DIV
PO Box 1602, Pocatello
ELECTRIC FURNACE, Pocatello
(see Calif)

GEM STATE CONSOLIDATED MINES, INC
3620 Sycamore Dr, Boise
Pres: T R Baugh
VP. J C Hammersberg
Sec. S A Neibaur
Treas: G E McKenney
GEM STATE MINE, Pearl via Eagle, 11 mi E of Emmett, undergr, Au, Ag, Pb, Zn
Gen Mgr: T R Baugh
Gen Supt: G E McKenney
Geol: Dr Warren Wagner
Prod: 40 tons
40-TON FLOT MILL, at mine

GOLCONDA LEAD MINES
Scott Bldg, Wallace
Pres & Gen Mgr
Wray Featherstone
VP: H F Magnuson
Sec-Treas Dan H Camp
GOLCONDA MINE, 2 mi E of Wallace, undergr, Pb, Ag, Zn
No Prod
200-TON FLOT MILL, Mullan Rd, Wallace
No Prod

GOLD HUNTER MNG CO
Wallace
Pres & Mgr. H L Day
Sec R W Anno
MINE, Shoshone Co, undergr. Pb, Ag, Zn

GOLDEN COPPER QUEEN MNG CORP
120 E 16th St, Idaho Falls
GOLDEN COPPER QUEEN MINE, Lemhi County, Au, Ag, Cu, Pb, Zn

GOLDEN NUGGET MINES & MILLS, INC
Fairfield
Pres: Harry Furrow
Sec· Mildred Robinson
CLAIMS, Little Smoky dist, Camas Co, Fairfield, undergr Au, Ag, Pb, Zn, Cu
Under devel

GOLDEN SCEPTRE MNG CO LTD
1311 9 E Main St, Spokane, Wash
Pres. C L Hamer
Sec: Norman H Bye
Mgr: Gus Anderson
GOLDEN SCEPTRE GRP, Boundary Co, Th
(mine leased to Northwest Prospecting Co, Spokane, Wash)

GRANADA LEAD MINES, INC
Scott Bldg, Wallace
Pres: Ross Roundy
VP: Wray Featherstone
Sec: John Peacock
Treas: H F Magnuson
GRANADA MINE, 2 1/2 mi E of Wallace, Pb, Ag, Zn
Gen Mgr. Wray Featherstone
Under devel

A P GREEN FIREBRICK CO, TROY DIV
Troy
MINE, Troy, clay

HANSEY COPPER AND GOLD MINES, INC
711 Hutton Bldg, Spokane, Wash
Pres. Osa Belsby
Sec: Geroge Wold
Agt: Sam Peterson
MINE, St Joe dist, Avery, undergr, Cu, Au

HAWKINS, J DEAN
Idaho City
HARPER #2 MINE, Boise County, Au, Ag, Cu, Pb, Zn

HECLA MNG CO
Box 320, Wallace
Pres L J Randall
VP. R E Sorenson, R N Hunt
Sec-Treas: John R Matthews
Purch Agt. R G Hull
STAR, POLARIS-SILVER SUMMIT & RADON MINES, Burke, undergr, Zn, Pb, Ag
Gen Mgr· William H Love
Gen Supt: Williams Anderson, Jr
Ch Geol: H E Harper
Mech Eng Harry Graff
Elec Eng: N Huhta
Mine Supt: William Dunphy (Star)
Mine Frm. L E Arnold (Star)
Mine Eng. Wallace Crandall
STAR, Owned by Bunker Hill Co
Prod: 800 tons
POLARIS-SILVER SUMMIT
Prod: 100 tons
RADON
Prod: 250 tons
800-TON FLOT MILL, Burke Zn, Pb
Mill Supt. Gordon Craig
Mill Frm: Robert Miller
Assayer. Thomas Hydorn
(see Utah)
(see also Lucky-Friday Silver Lead Mines)

HIGHLAND-SURPRISE CONSOL MNG CO
Box 689, Gyde-Taylor Bldg Wallace
Pres: Henry C Smith
Sec-Treas· W A Callaway
HIGHLAND-SURPRISE MINE, Kellogg, 15 mi SW of Kellogg, undergr, Zn, Pb, Ag
No Prod
300-TON FLOT MILL
No Prod

C C HILL CO
W 815 Mt View Ave, , Spokane, Wash
MC CLEARY MINE, Tensed, Fe
(see Wash)

HINES, MARVIN
MAST, Art
Sagle
BROWN BEAR MINE, Bonner County, Au, Ag, Cu, Pb, Zn

HOLLY CORP
1212 Hartford Bldg, Dallas, Tex
Pres: Guy M Willis
VP: Robert I Haggart
HERMES MINE, Yellow Pine, undergr, open pit, Hg
200-TON FLOT MILL, at mine
No Prod
(see Tex)

HORNSILVER MNG & MLG CO
(Merged into Day Mines, Inc, 1960 - See Day Mines)

HUNTER CREEK MNG CO
909 W Sprague, Spokane, Wash
Pres & Mgr: L Howe
Sec: C C Anderson
MINE, SHOSHONE CO, Ag Pb, Zn
No Prod

HYPOTHEEK MNG & MLG CO
510 Bank St, Wallace
VP: Sig Torkelson
OLD HYPOTHEEK & KING OF PINE CREEK MINES, Kingston Au, Ag, Pb
No Prod

IDAHO CONSOL MINES INC
4109 Arcade Bldg
Seattle 1, Wash
Pres-Purch Agt:
Edmund G Wilson
VP-Treas. Fred J Wettrick
Sec. Robert J McConnell
TWIN PEAKS MINE, Salmon, 18 mi S of Salmon on U S Hwy 93, 3 1/2 mi off Hwy at Twin Peaks Bridge on Salmon River, undergr, Pb, Cu, Ag
Gen Mgr-Gen Supt-Mine Supt. Charles Kapp
Asst Gen Mgr-Asst Mine Supt: Don E Nichols
Geol-Mine Eng:
Allen C Merritt
Prod: 100 tons
150-TON MILL, at mine
Mill Supt: Don E Nichols

IDAHO CUSTER SILVER-LEAD MINES, INC
Box 469, Wallace
Pres: Alvo V Alvensleben
VP: O O Miller
Sec & Treas. H F Magnuson
LIVINGSTON MINE, 18 mi S of Clayton, Pb
200-TON MILL
No Prod

IDAHO GARNET ABRASIVE CO
707 W 5th Ave, Spokane 4, Washington
MINE, Fernwood, garnet

IDAHO LAKEVIEW MINES CO
705 Peyton Bldg, Spokane 1, Washington
Pres: Joseph Drumheller
VP: Kenneth M Howser
Sec-Treas. L R Gordon
MINE, undergr, Pb, Ag, Zn
Gen Mgr: Federal Resources Corp
Under devel-no prod
(see Federal Resources Corp, Idaho)

IDAHO MNG & MLG CO
407 Main St, Lewiston
Pres: Philip W Jungert
VP: Clyde E Jungert
Anton R Backus
Sec-Treas. Marion G Jungert
FLORENCE BASIN PLACERS, Florence, 40 mi S of Grangeville, placer, Au, Ag, monazite, zircon, Ti
Gen Mgr: Philip W Jungert
Gen Supt: Marion G Jungert
Geol: Anton R Backus
Mine Eng: Lyle S D Green
Prod: 2, 000 cu yds
Under devel
Currently erecting a No 2 Yuba bucket line gold dredge

IDAHO MNG & SMELTING CO
POBox 2755, Boise
Gen Mgr: J B Adrian

IDAHO PERLITE, INC
1206 N 13th St, Boise
Pres & Mgr· Elfriede Prins
Sec. Eric G Osterberg
MINE, Owyhee Co, perlite

IDAHO PORTLAND CEMENT CO
Inkom
MINE, Inkom, limestone

IDAHO WILLOW CREEK MNG CO
Wallace
Pres & Mgr. W Zanetti
Sec: H F Magnuson
MINE, Shoshone Co, Pb, Ag
No Prod

IDA-MICA CORP
(formerly WESTERN MICA CORP)
312 S Washington St, Moscow
MINE, Emery, mica
Under devel

INSPIRATION LEAD CO, INC
W 909 Sprague Ave
Spokane 4, Washington
Pres. C C Anderson
Sec-Treas & Gen Mgr·
W T Anderson

Agt: E C Keilhauer
INSPIRATION SILVERORE GROUP, Wallace, Evolution, & Beaver dists, undergr, Pb, Zn, Ag
Mine Supt. Ellery Keilhauer
(property co-owned and co-developed by Silverore Mines, Inc)
(See Utah)

IRON MASK MNG CO
Sandpoint
Pres. George M Watt
Sec Robert W Woods
14 CLAIMS, Pend Oreille dist, Sagle, undergr, Ag

JOSUE, A W
Garden Valley
GOLD BELT MINE, Boise County, Au, Ag, Cu, Pb, Zn

KERN COUNTY LAND COMPANY
Consulting Geol representing Kern County Land Company. David L Moore, 405 McCarty Bldg, Boise
Mgr, Minerals Dept.
William T Griswold
(See Ariz, Calif, Utah)

KIMBERLY GOLD MINES INC
Box 62, Tacoma, Wash
Pres. O T Oiness
Sec: L F Denbrook
Mgr: R H Nelson
Agt: William Dee
MINE, Marshall Dist, Idaho County, Au, Ag, Cu, Pb, Zn
No Prod

KUBESH, JAMES E
1622 9th Ave, Sweet Home, Ore
FREE GOLD MINES, Pierce dist, Clearwater County, undergr, placer, open pit, Au, rare earths
Gen Mgr: James E Kubesh
Asst Gen Mgr. Dave Oliver
Gen Supt: Clara Bloomquist
Under devel
25-TON GRAV MILL, Pierce dist
RETORT FURNACE

LEE MINES INC
123 N Foote, Olympia, Washington
Pres & Purch Agt:
Mordello L Lee
VP: Paul V Smith
Sec-Treas: Margaret Ojeda
AFTERTHOUGHT MINE, Silver City, undergr, Au, Ag,
Gen Mgr & Mech Eng:
Mordello L Lee
Elec Eng: Frank Kihaly
Under devel
50-TON GRAVITY & FLOTATION MILL, at mine

LEESBURG MNG CO
2403 S Tacoma Way, Tacoma, Washington
Pres: L Antonette
Sec N B Cowan
Mgr: A G Nickelsen
MINE, Salmon, Idaho
No Prod

LITTLE QUEEN MINES, INC
Atlanta
Pres: H D Hollenbeck
Sec & Mgr: H M Greenwald
MINE, undergr, Au, Ag, Pb, Zn, WO3
50-TON MILL
Under devel

LUCKY FRIDAY SILVER-LEAD MINES CO
Box 320, Wallace
Pres: L J Randall
VP: H F Magnuson
Sec-Treas: D W Morehouse
Asst Sec-Treas: B French
LUCKY FRIDAY MINE, 1 mi E of Mullan, Hunter dist, Pb, Ag, Zn
Gen Mgr. Wm H Love
Gen Supt: Wm Anderson, Jr.
Ch Geol. H E Harper
Ch Engr. W E Crandall
Mine Supt: Dave Elder
Asst Mine Supt.
Wray Featherstone
Geol. P E Hyde
Mine Engr. Wm Folwell
Prod: 500 tons
500-TON FLOT MILL, at mine
Mill Supt. Gordon Craig
Asst Mill Supt: Chas Kidwell
Mill Frm: Ben Holdaway
Assay Tom Hydorn
(Control & operations by Hecla Mng co)

MACKAY EXPLORATION CO
4212 Franklin Rd, Boise
EMPIRE GROUP MINES, Custer County, Au, Ag, Cu, Pb, Zn

MAJESTIC SILVER LEAD MINES, INC
110 S Division, Kellogg
Pres. H U Brass
Sec: C Y Geraghty
MINE
No Prod

MARR, FRANK N
611 Peyton Bldg, Spokane Washington
BUNKER HILL (lease), Box 930, Kellogg, undergr, Pb, Ag, Zn
Gen Mgr: C F Redding
Mine Frm: Milton Turley
Prod: 50 tons
150-TON FLOT MILL, Wardner

MASCOT MINES, INC.
Box 989, Kellogg
Pres: Ben Smick
VP & Purch Agt:
Dunham Bell
Sec: Harold Reugh
Asst Sec: Ronald E Eggart
LITTLE PITTSBURGH MINE, Pine Creek, Kellogg, undergr, Au, Pb, Ag
No Prod
150-TON FLOT MILL, Pine Cr
No Prod

METALINE & PINE CREEK CONSOL MNG CO
Scott Bldg, Wallace
Pres: Stanley Easton
VP: J M Haffner
Sec: L J Randall
Asst Sec: H F Magnuson

METROPOLITAN MINES CORP, LTD
Scott Bldg, Wallace
Pres: H J Casey
Sec-Treas: John H Usher
METROPOLITAN GROUP, Shoshone County, Ag, Pb, Cu
(under devel by Sunshine Mng Co)
(See Black Bear Silver-Lead Mines, Inc)

MIDVALE MNG CO
407 Lloyd Bldg, Seattle 1, Washington
Pres & Mgr: R H Bailey
Sec: George Pohlman
Agt: W H Featherstone
ANCHOR & WEST HECLA GROUPS, Lelande dist, Burke, undergr, Pb, Ag
Under devel

MONARCA MNG CO
4724 Gage St, Boise
Pres & Mgr: Vern Markey
MINE, Owyhee Co, Ag, Au
Under devel

MONSANTO CHEM CO INORGANIC CHEM DIV
Soda Springs
Plant Mgr: F P Hendrickson
Prod Supt: R H Crouse
Maint Supt: J H Canaan
Plant Buyer: G F Dupin
Personnel Supt: G F Busch
BALLARD MINE, 12 mi N of Soda Springs, open pit, phosphate rock
Mine Supt: G L Atwood
MILL, 2 mi N of Soda Springs,

rotary kiln
Mill Supt: T V Kramer
ELECTROLYTIC SMELTER, 2 mi N of Soda Springs
Supt: D L Gillette
(See Mo, Tenn)

MONTANA COAL & IRON CO
Red Lodge, Mont
Pres & Treas: O C Smith
VP & Sec: T C Smith
BLACK PINE MINE, Blackbird dist, Lemhi County, undergr, Ag, Cu
No Prod until spring

MOOSE MT MNG CO
1521 N 11th St, Coeur d'Alene
LILLY #1 & 2 MINES, Clearwater County, Au, Ag, Cu, Pb, Zn

MORNING MIST MNG CORP
6712 Hummel Dr, Boise
Pres & Mgr: M A Hanson
Sec: Lou Hanson
400 ACRES, GRAYBACK GULCH, Idaho City, Cu, Au, Ag, Hg, U_3O_8
Under explor

MOTHER LODE TRUST
Box 538, Ketchum
Trustee: Heber Comer
MINE, Warm Springs Cr dist, Ketchum, open pit, Pb, Ag

MOUNTAIN GOAT LEASE
Scott Bldg, Wallace
Part: W C Kennedy, Herb Zanetti
MINE, underground, Zn, Pb, Ag
Prod: 100 tons
100-TON FLOTATION MILL
Mill Supt: Robert A Rice
Assayer: Edward Small

MULLAN METALS, INC
PO Box 1131, Wallace
Pres: C E Horning
Sec: W J Emacio
Mgr. D Elder
MINE, Shoshone Co, Pb, Zn, Ag
No Prod

MULLAN SILVER-LEAD CO
Box 469, Wallace
Pres: J E McKay
VP: James Doyle, Jr
Sec-Treas: H F Magnuson
MINE, Pb, Ag, Zn
No Prod

NABOB SILVER-LEAD CO
Box 899, Kellogg
Pres: H J Hull
VP, Gen Mgr & Purch Agt: C C Dunkle
Sec-Treas: June H Olsen
NABOB SILVER-LEAD CO MINE Pine Cr, undergr, Zn, Pb
350-TON FLOT MILL
No Prod

NEVILLE, CORBIN
417 Elm St, Wallace
TAMARACK # 5 MINE, Shoshone Co, Au, Ag, Cu, Pb, Zn

NORTH FORK MNG CO
Box 469, Wallace
VP: Vernon J Robinson
Sec: Earl Chilcott
MINE, 18 mi N of Wallace
No Prod

NORTHWEST MINERALS INC
PO Box 1344, Spokane 1, Washington
Pres: Forrest M Garrett
VP: H E Besly
Sec-Treas: Don A Gillis
HUNTER-CONTINENTAL MINE, Pinehurst, undergr, Pb, Ag
Gen Mgr: H E Besly
Geol: H Grattan Lynch
No Prod (assessment work only)
(See Washington)

ONEIDA PERLITE CORP
Malad
Pres: M J Hess
VP: U Champneys
MINE, Oneida Co, Perlite
Under devel

OOM PAUL CONSOLIDATED MNG CO
Wallace
Pres: C A Tilford
VP: Sidney E Jones
Mgr: L J Randall
Asst Sec-Treas: L S Eddins
MINE, Shoshone Co, Pb, Ag
No Prod

PARKER MINING CO, INC
Box 538, Ketchum
Pres & Mgr: Heber Comer
Sec: Bill Brooks
PARKER & AMICUS GROUPS, Warm Springs Cr dist, Ketchum, undergr, Pb, Ag
Property leased-extensive development planned

PAYMASTER, INC
611 Peyton Bldg
Spokane, Washington
Pres: Frank N Marr
Sec: C D Randall
MINE, 31 mi SW of Arco, undergr,
No Prod

PHILLIPS PETROLEUM CO
Box 2178, Boise
Pres: Paul Endacott
Sec: Paul J Parker
Idaho Agt: Frank Martin Jr
MINE, Little Bill Group in Cold Cr in Stanley Basin, Custer County, Claims leased from Bill Brooks Melvin Peterson & Jules Kauffman, Hailey
No Prod
HARDEE GROUP
No Prod
DEERSTRIKE AND ELK GRP, U_3O_8

PORTER BROS CORP
PO Box 667, Boise
Pres: R P Porter
VP: Richard B Porter
Sec-Treas: James O Helland
Purch Agt: D L Runft
BEAR VALLEY PLACER, at Bear Valley, Valley County, placer, columbium, tantalum, uranium, monazite, rare earths
300-TON GRAV MILL, Lowman
Mill Supt: A L Rose

PRINCETON MNG CO
Scott Bldg, Wallace
Pres: H J Hull
VP: George M Grismer
Sec-Treas: H F Magnuson
MINE, E of Mullan
Under devel

QUEEN HILL MNG CO
409 Church St, Sandpoint
Pres: H Weaver
Sec: A Abromeit
Mgr. Sven Anderson
MINE, Moyie Yaak dist, Bonners Ferry, undergr. & open pit, Au, Ag, Pb, Cu

RAINBOW MNG & MLG CO LTD
Box 889, Wallace
Pres: H C Mowery
Sec: W A Callaway
RAINBOW #1 GROUP, Evolution dist, Cu, Ag, Pb, Zn

RAMSHORN MINES CO
333 Felt Bldg, Salt Lake City, Utah
MINE, Challis, undergr, Ag, Pb
(Property under lease to Bayhorse Mines, Inc, Challis, Idaho)
(See Utah)

RARE METALS CORP OF AMERICA
6th Floor, El Paso Natural Gas Bldg,
315 E 2nd South, Salt Lake City, Utah
VP: M H Kline
IDAHO-ALMADEN MINE, Box 627, Weiser, open pit, Hg
Mine Supt: H W Horst
Offc Mgr: A G O'Leary
Prod: 175 tons
175-TON ROTARY KILN MILL, Weiser
Mill Supt: H W Horst
BIG HANK, PINE HEN, LUCKY STRIKE GROUPS
No Prod
PROPERTIES, Agency Cr area, U_3O_8, Thorium
Under explor
(See Ariz, N Mex, Utah)

REINDEER-QUEEN MNG CO
Scott Bldg, Wallace
Pres & Mgr: C A Tillford
Sec: H F Magnuson
MINE, Mullan
No Prod

RICE, ROBERT
Osburn
DEER TRAIL MINE, Custer County, undergr, Au, Ag, Cu, Pb, Zn

RICHARDSON PLACERS
Box 756, Salmon
Gen Mgr: G E Shoup
RICHARDSON PLACERS, Leesburg, placer, Au, Ag petrified wood opalized
Gen Mgr: G E Shoup
Prod: (in summer only) placers - 1, 000 yds
MILL, hydraulic & sluice

RICHLAND MINES INC
POBox 5042, Boise
Pres: Henry L Johnson
VP: Roy A Norquist
Sec: Martin Newman
RICHLAND GROUP, Placerville, undergr, Ag, Pb, Zn, Au, Bi,
No Prod

ROCKCREEK SILVER-LEAD CO
2008 W Riverside Ave
Spokane, Washington
Pres: F Messer
Sec & Mgr: J H Christman
MINE, Wallace, Pb, Ag

ROOD PLACER
Shoup
Own: Frank H Rood
Sec: Hazel Rood
MAEBELL MINE, open pit and placer, Au
Under devel

RUBY COMPANY
Box 2777, Boise
Pres: J R Simplot
Sec: L E Haight
Mgr: P T Peterson
MINE, Bovill, open pit, clay, silica
Under devel

ST PAUL LEAD CO
PO Box 750, Kellogg
MINES, Montana
(See Mont)

SALMON RIVER SCHEELITE CORP
Clayton
Pres: Harvey Penney
Sec-Treas & Gen Mgr: James E Clutis
Asst Gen Mgr. D P Lemons
TUNGSTEN JIM MINE, Bayhorse dist, Clayton, Thompson Cr, undergr, WO_3
Under devel
40-TON GRAV MILL, at mine

SALMON RIVER URANIUM DEVEL INC
Salmon
Pres & Mgr: W Wilcox
Sec: Mary E Wilcox
MINE, Mineral Hill Dist, Lemhi Co, Northfork, undergr, U_3O_8
MILL, leased to Nuclear Fuels and Rare Metals, Inc

SAN FRANCISCO CHEMICAL CO
Montpelier
Pres & Gen Mgr: D L King
VP: W Jerome Taylor
Sec-Treas-Purch Agt: Calvin P Sims
WATERLOO MINE, E of Montpelier, open pit, phosphate
Asst Gen Mgr: Robert K Barnes
Met: Jay Twitchell
(see Utah, Wyo)

SAN RAPHAEL MINES INC
2001 S 23 East St,
Salt Lake City, Utah
Pres: O C Larson
Sec: Della M. Larson
Mgr: L T Reiter
Agent: C S Myers
HARD TIMES GROUP MINE, Hailey
(Mine is under sublease)

SCOTT, DON
Gen Del, Melba
WHITE HORSE MINE, Owyhee County, Au, Ag, Cu, Pb, Zn

SEATON, E T
Box 151, Atlanta
GOLDEN STRINGER MINE, Elmore County, Au, Ag, Cu, Pb, Zn

SIDNEY MINING CO
102 Weber Bank Bldg,
Kellogg
Pres: M C Brown
VP: E K Barnes
Sec-Treas: Ben Smick
SIDNEY MINE, 15 mi S of Kellogg on E fork of Pine Cr, undergr, Zn, Ag, Pb
Gen Mgr: M C Brown
No Prod
300-TON FLOT MILL, Pine Cr dist 15 mi S of Kellogg
BAYHORSE MINES GROUP, Challis, Bayhorse Cr 10 mi SW of Challis, undergr, Ag, Pb
Gen Mgr: M C Brown
Mine Frm: Bill Robinson
Under explor
80-TON FLOT GRAV MILL, Bayhorse

SIGNAL MNG CO
410 Main St, Kellogg
Pres: H G Alway
VP: John B Penney
Sec: Wendell R Brainard
HILARITY GROUP, 7 mi W of Kellogg, undergr, Zn, Pb, Ag
No Prod

SILVER BUCKLE MNG CO
Box 1088, Wallace
Pres: Dr F E Scott
VP & Gen Mgr. Clark L Wilson
Sec-Treas: Alden Hull
Office Mgr Jack D Gay
Gen Supt and Geol. George L Cloward
SILVER BUCKLE-VINDICATOR PROJECT, Wallace & Mullan, Pb, Ag
No Prod

SILVER DOLLAR MNG CO
909 W Sprague Ave
PO Box 122, Spokane 10, Washington
Pres: Elmer E Johnston
VP: L E Nicholls
Sec-Treas: W T Anderson
Asst Sec-Treas: W J Carlson
SILVER DOLLAR MINE, Osburn, undergr, Pb, Ag
Geol: P E Oscarson

SILVER STAR MINES INC
314 High Bank St,
Wallace
Pres-Purch Agt-Gen Mgr: Phillip G Anderson
Sec-Treas: Jerry LeCelle
SILVER STAR MINES, Placer Center dist, undergr, Pb, Ag
No Prod

SILVER STAR-QUEENS MINES, INC
909 Trans American Life Bldg, Fort Worth, Texas
Pres: Joseph A Foster
VP & Sec: Robert Decker
Treas: Ned James
Purch Agt: Ralph Thurston
MINE, Box 158, Hailey, 1 mi W of Bellevue, undergr, Pb, Ag, Zn
Gen Mgr & Met: Ralph Thurston
Gen Supt: Roy T Fitz
Under devel
(See Tex)

SILVER SYNDICATE INC
Scott Bldg, Wallace
Pres: W M Yeaman
VP & Gen Mgr. N M Smith
Sec-Treas: Ray Morrison
SILVER SYNDICATE MINE, 10 mi from Wallace, undergr, Cu, Pb, Zn, Ag, antimony
Prod: 100 tons
(Operated by Sunshine Mng Co)

SILVERORE MINES INC
Box 178, Spokane, Wash
Pres: Laurence Howe
Sec & Mgr: W T Anderson
Agt: E C Keilhauer
SILVERORE GROUP, Placer Center, Evolution & Beaver dists, Osburn, undergr, Pb, Zn, Ag
(Property co-owned and co-developed by Inspiration Lead Co, Inc)

J R SIMPLOT CO EXPLORATION AND DEVELOPMENT DIVISION
PO Box 2777, Bank of Idaho Bldg, Boise
Pres: J R Simplot
VP: W Grant Kilbourne
Treas: John M Dahl
Sec & Att: Lloyd E Haight
Staff Att: Dennis Olsen
Mgr Mines: George A McHugh
Asst Mgr Explor Div: C W Sweetwood
Traff Mgr: Vern J Tannlund
Asst Traff Mgr: Norman Towne
Staff Geol: Joe Jemmett, David Schwarze
Safe & Pers: Hugh D Larkin
Eng & Design: Robert L Long, Ch Eng, Victor E Hansen, Asst
Research Lab: Wm Boyd, Dir Andrew Lohvinen, Clifford Bissonette, Roger Humberger, Harold Snell, staff technicians
Explor & Drilling: John Nordland, Maurice LeMay
MINERALS & CHEMICAL DIV, Box 912, Pocatello
Gen Mgr: W Grant Kilbourne
GAY MINE, near Fr: Hall, open pit, phosphate
Res Mgr. O E Pothier
Mine Supt: John Clouser
Geol: Norman Lehman
Mine Frm: Tom Hughes
Mine Eng: Robert Hill
Prod: 10, 000 tons
BIG CREEK DREDGE, Ada Co, Cb, Ta, Re, Th, Ti
SAND SEP PLANT, Ada Co
FERTILIZER PLANT, Pocatello
Plant Mgr: A Dale Dunn
Plant Supt. Oscar Finklenburg
Plant Eng: Keith A Bithell
Auditor: William Hahn
PHOSPHATE MINE, Conda, open pit, phosphate rock (purchased 1960 from The Anaconda Company)
1, 000-TON CRUSHING, WASHING & DRYING PLANT, Conda
(see Mont, Nev, Wyo)

SNOOSE MNG CO
219 N 17th St, Boise
VP: Mrs A M Jensen
Sec-Treas: R S Bacon
SNOOSE MINE, 2 1/2 mi SE of Hailey, undergr, Zn, Pb, Ag
No Prod

SOLAR-X CORP
7717 Ustick Rd, Boise
Pres & Purch Agt: Kenneth Arnold
VP: W E Thalman
Sec-Treas: Don A Woodward
(See Oregon)

SPOKANE-IDAHO MNG CO
611 Peyton Bldg, Spokane 1,

Washington
Pres: Frank N Marr
Sec: C D Randall
Treas: Charles E Marr, Jr
CONSTITUTION MINE, 8 1/2 mi SE of Pinehurst, undergr, Zn, Pb
No Prod
(See Washington)

SPOKANE NATIONAL MINES, INC
414 Fernwell Bldg, Spokane 1, Washington
Pres & Purch Agt: G H Allison
VP: H J Tibbits
Sec: Cline E Tedrow
LIBERAL KING MINE, (joint operation with Sunset Mines, Inc), Kellogg, undergr, Ag, Au, Pb, Cu, Zn
Gen Mgr: G H Allison
Mine Frm: Carl Caracker
No Prod
(See Mont, Wash; Sunset Mines, Inc, Idaho, Mont, Wash)

SQUARE DEAL MNG & MLG CO
Wallace
VP: H F Magnuson
Sec: Wray Featherstone
Mgr: W Featherstone
MINE, Shoshone Co, Pb, Ag, Zn
Under devel

SUCCESS MNG CO, LTD
Wallace
Pres: Henry L Day
Sec: R W Anno
SUCCESS MINE, Wallace, Zn, Pb
No Prod

SUNSET MINES, INC
414 Fernwell Bldg, Spokane 1, Washington
Pres: G H Allison
VP: Cline E Tedrow
Sec-Treas: H J Tibbits
LIBERAL KING MINE, (joint operation with Spokane National Mines, Inc), undergr, Ag, Au, Pb, Cu, Zn
No Prod
150-TON FLOT MILL, Pine Cr
(See Sunset Mines, Mont & Wash; Spokane National Mines, Idaho, Mont, Wash)

SUNSHINE CONS, INC
102 Sidney Bldg, Kellogg
Pres: Y M Yeaman
VP: Norman M Smith
Sec & Treas: Ray Morrison
Gen Mgr: N M Smith
SUNSHINE CONS MINE, 6 mi E of Kellogg, undergr, Ag
(Under devel by Sunshine Mng Co)

SUNSHINE MNG CO
W 300 Mission Ave
Spokane 1, Washington
Pres: Robert M Hardy, Jr
VP: C M Hull
Sec: Stanton B Bennett
Treas: Vincent P Whelan
Purch Agt: N J Osborne
Mgr, Mng Div: John Edgar
Mgr, Petroleum Div: A F Wynn
SUNSHINE MINE, Box 1080 Kellogg, undergr, Ag, Pb, Cu, Sb
Mgr: H B Johnson
Ch Geol: James B Colson
Ch Eng: James C Durham
Mine Frm: Charles A Angle
Prod: 750 tons
1,000-TON FLOT MILL
Mill Supt: Franklin H Sharp
Asst Mill Supt: Leon N Barr
Mill Frm: Lyle Cornell
Antimony Plant Frm: Harold Palmer
SILVER SYNDICATE MINE
(See Silver Syndicate, Inc)
SUNSHINE CONS MINE
(See Sunshine Cons)
(See New Mexico, Wash)

TALACHE MINES, INC
Box 2088, Boise
Pres, Mgr, Agt: A H Burroughs, Jr
Sec: W A Griffin

BOISE-ROCHESTER & MONARCH GROUP, Middle Boise dist, Elmore Co, undergr, Au, Ag
350-TON FLOT & AMAL MILL

TAYLOR, IVAN I
Box 65, Mackay
WHITE KNOB MINE, Custer County, Ag, Ag, Cu, Pb, Zn

TEDDY MNG & MLG CO, LTD
Star Rte Box 1440, Tacoma, Washington
Pres & Idaho Agt: Harvey Miller, Kellogg
VP: Leo Giem, Spokane
Sec-Treas: E I Little, Tacoma
TEDDY MINE, Kellogg, undergr, Pb, Zn
No Prod

TIDAL WAVE MNG CO
Gilmore
TIDAL WAVE MINE, Idaho County, Au, Ag, Cu, Pb, Zn

TREASUREMONT MNG CO
1129 10th Avenue N, Seattle, Washington
Pres & Gen Mgr: W J Logus
Sec & Treas: M A Logus
QUIGLEY MINE, 6 1/2 mi E of Hailey, undergr, Pb, Ag
Geol: James M McDonald
Mine Supt: Al Linderman
No Prod

TRIANGLE MNG CO
1610 N 8th St, Boise
COME BACK MINE, Boise County Au, Ag, Cu, Pb, Zn

UMONT MNG CO
King St Dock, Burlington, Vt
Pres: L P Evans, Jr
Sec: R H Wadhams
Mgr: D P Wheeler, Jr
MINE

UNITED IDAHO MNG CO
808 Newhouse Bldg, Salt Lake City, Utah
Pres & Gen Mgr: Roger V Pierce
UNITED IDAHO MINE, Gilmore, undergr, Pb, Ag
No Prod

WALL STREET MNG CO
Box 320, Wallace
Pres & Mgr: L J Randall
VP: Don E Major
Sec-Treas: L S Eddins
MINE, Mullan
No Prod

WAR EAGLE MNG CO, INC
114 E Chestnut St, Yakima, Wash
WAR EAGLE MINE, McCall, undergr, Au, Ag
Gen Mgr: E W Peterson
No Prod
75-TON HEAVY MEDIA MILL, McCall
(See Wash)

WASHINGTON MINING CO
Wallace
Pres: James G Towles
Sec-Treas: Mark Evans
MINE, Leland dist, Burke, undergr Pb, Ag, Zn
Under devel

WELLS CARGO, INC
Box 430, Las Vegas, Nev
KIT QUARRY, Pocatello, open pit, silica
Prod: 50,000 tons yrly
(See Nev)

WEST STAR MINING CO
1221 6th St, Coeur d'Alene
Pres: K H Blaesser
Sec: H Stewart
Asst Sec: A Markwell
WEST STAR GROUP, Leland and Hunter dist Shoshone County, undergr, Pb, Ag, Au

WESTERN FLUORITE MINING CO, INC
Box 455, Hailey
Pres: Henry S Childs
VP: Wilson Hawkins
Sec-Treas: Tom Haley
EAST BASIN & LIGHTNING GROUP, Eastern Basin Cr area, Stanley Basin, Custer County, Claim leased from Keith & Alice Evans, Ketchum, undergr, open pit, U_3O_8
Supt: Henry C Childs
Under devel

WHELCHEL MINES CO
1019 Arthur St, Caldwell
Pres: William S Whelchel
VP: Ralph A Whelchel
Sec-Treas: Thressa M Whelchel
TWIN BUTTES GROUP # 1
Owyhee County, Box 7, Caldwell, rare earth, gypsum
Under devel
(See Nev, Utah)

WHITE KNOB MNG CO
1019 Newhouse Bldg, Salt Lake City, Utah
Pres: O A Glaeser
HOMESTAKE, COPPER QUEEN MINES, Alder Creek, Mackay Pb, Zn, Ag

WHITEDELF MNG & DEVEL CO
401 Empire State Bldg Spokane 1, Wash
Pres-Purch Agt: Compton I White
VP: H G Loop
Sec-Treas: E I Fisher
WHITEDELF MINE, Clark Fork, Pb, Ag, Zn
Gen Mgr-Mine Supt. Compton I White
100-TON MILL, Clark Fork, Idaho
(See Wash)

WHITEDELPH EXTENSION MNG CO
Box 182, Sandpoint
Pres & Mgr: E Abromett
Sec: Thornton J Davis
Mgr: Sven A Anderson
MINE, Clark Fork, undergr, Ag, Pb
Property leased

WILLIAMS, THORNLEY U
Hailey
WHALE & STAR MINES, Blaine County, Au, Ag, Cu, Pb, Zn

WILSON, FLOYD
Box 445, Hailey
LA GRANDE MINE, Blaine County, Au, Ag, Cu, Pb, Zn

WONDER LODE CLAIMS INC
Box 756, Salmon
Pres: G E Shoup
VP: R M Shoup, M R Shoup
Sec & Treas: F H Smook
Purch Agt: R M Shoup
ABANDONED LODE CLAIMS undergr, open pit, Au, Ag, Th, rare earths
Mine Supt: G E Shoup
Asst Mine Supt: R M Shoup

WONDER MNG CO
Culdesac
Own: Ernest Butler
WONDER MINE, Golden, undergr, Au
Gen Mgr & Mine Supt: Ernest Butler
20-TON AMALGAMATION MILL, Golden

YREKA UNITED INC
Kellogg
Pres: Lester S Harrison
VP: Wendell R Brainard
Sec-Treas: C Whalen
MINE, merged group, including properties of Alturo, Hill, Mohawk Silver-Lead, Paramount, Yreka, Caleconia Silver-Lead, Lead Blossom, New Hilarity, United Mines Mng Co, on upper Elk Cr, SW of Kellogg, Shoshone County slated for deep-level devel by (The Bunker Hill Co, under operating agreement

ILLINOIS

ALUMINUM COMPANY OF AMERICA
1501 Alcoa Bldg, Pittsburgh 19, Pa
Pres: Lawrence Litchfield, Jr
V P Raw Mat & Refin: George W Streepey
Sec: Alfred M Hunt
Treas: Matt W Stanley
Purch Agt: Thomas O English
Gen Mgr, Raw Mat Div: R F Miller
OS
undergr, fluorspar
Gen Mgr: W S Skeels
Mine Supt: W H Harrison
Prod: 500 tons
380-TON FLOT GRAV MILL, ROSICLARE MINE, Rosiclare, Mill Supt: Willard C Lay
(See Ark, Ky Pa)

AMERICAN COLLOID CO
5100 Suffield Court, Skokie
Pres & Gen Mgr: Paul Hechtner
VP & Treas: W D Weaver
VP: Clyde A Sanders
VP: E P Weaver
Asst Sec: Jeanette Dixon
Purch Agt: Roy H Harris
(See Miss, S Dak, Wyo)

AMERICAN ZINC CO OF ILLINOIS (SUBSID OF AMERICAN ZINC, LEAD & SMELT CO)
1515 Paul Brown Bldg, St Louis 1, Missouri
ROASTING & BY-PROD PLANT, Fairmont City
VP: G L Spencer, Jr
Plant Mgr: George Kromen
Purch Agt: G E James
ELECTROLYTIC SMELTER, Monsanto
Mgr: T I Moore
Gen Supt: George A Allison
Supt of Met: R K Carpenter
Purch Agt: V M Provow
Prod: 54,000 tons hi grade slab zinc annually
SMELTING & PROCESSING PLANT, Hillsboro
Mgr: H R Wampler
Met Div Supt: J F Clark
Gen Frm. H J Collett
Oxide Supt: Oscar Hassel
Assay: Orville Rutledge
Prod: 12,800 tons Amer prod zinc oxide yrly
2,700 tons Fr prod zinc oxide yrly
7,150 tons slab zinc yrly
(See Ariz, Mo, Ohio, Okla, N Mex, Tenn, Tex, Utah, Wash, Wisc)

CALUMET & HECLA, INC
122 S Michigan Ave, Chicago 3, Ill
Pres: H Y Bassett
VP-Finance: C C Jung
Sec: A E Petermann
Treas: F J Gibbons
(See Mich, N Mex, NY)

THE CELOTEX CORP HAMLIN DIV
120 S La Salle St, Chicago
(See Iowa, Tex)

CENTRAL FARMERS FERTILIZER CO
205 W Wacker Dr, Chicago
VP: J P Cairns
Sec-Treas: E E Rennhack
Agt: J L Eberle
(See Idaho)

THE EAGLE-PICHER CO, CHEMICALS & METALS DIVISION
PO Box 1040, Galena
Mgr of Op: Robert L Haffner
Gen Supt: Harold H Haman
Asst Gen Supt: Henry B Farrey
Geol: Wm E Arndt
Maint Supt: Clarence P Lyden
Mine Supt: Edmund L Houy, Harold A Wisco
Mill Supt: Cecil C Crow
Mill Frm: Billy Crow, Glenn Brotsman
Mine Supt: Victor E Van Matre
GRAHAM MINE, Galena, undergr, Zn, Pb
Prod: 1,500 tons
GRAHAM MILL, Galena, flot & grav
Prod: 1,500 tons Zn
O'ROURKE MINE, Galena, Zn, Pb
Prod: 400 tons
(See Kans, Nev, Ohio, Okla, Wisc)

HERRSTROM, H O
2305 12th St, Rock Island
(See Wyo)

HICKORY HILL MNG CO
Galena
HARTWICK MINE, undergr
Pb

HOEB MNG CO
Cave-in-Rock
Pres P A Hill
VP: H W Bales
Sec-Treas & Gen Mgr: Lowell Oxford
Purch Agt: Carl Embree
HOEB MINE, undergr, CaF_2 Pb, Zn
Gen Supt: Ray Crabb
Gen Mgr-Geol: Lowell Oxford

INDEPENDENT SALT CO
4115 Packers Ave, Chicago 9, Ill
MINE, Kanopolis, Kansas, salt
(See Kansas)

INLAND STEEL CO
30 W Monroe Chicago 3, Ill
Chmn: J L Block
Pres: J F Smith, Jr
VP, Raw Mat: Carl H Jacobs
Sec: Graydon Megan
Treas: W H Lowe
(See Mich, Minn)

INTERNATIONAL MINERALS & CHEMICAL CORP AGRI CHEMICAL DIVISION
5401 Old Orchard Rd, Skokie
Pres: Thomas M Ware
VP, Oprs, Agri Chem Div: David J Stark
Treas: R A Lenon
Sec: C M Edwards
Purch Agt: C F Teepie
(See Ariz, Fla, Maine, Miss, N Mex, NC, SD, Tenn, Va, Wyo)

MINERVA OIL CO FLUORSPAR DIV
Div'n Off: Myers Bldg, Box 531, Eldorado
VP & Gen Mgr: Gill Montgomery
Purch Agt & Sls Mgr: S J Kelly
MINERVA MINE NO 1, Cave-in-Rock, undergr, CaF_2, Zn S
Mine Supt: C F Callahan
Mine Frm: James Charlton
Eng: D B Holbrook
Mng Eng: J J Daly
Geol: Donald W Saxby
Plant Mgr: O E Anderson
Prod: 300 tons
325-TON FLOT MILL. CaF_2, Zn conc
Mill Supt. George H Musson
Chem: C B Rash
Assayer: A C Reed
CRYSTAL MINE, Rt 1, Elizabethtown, undergr, CaF_2
Plant Mgr. I V Robertson
Mine Frm. Raynard Dutton
Prod: 150 tons
750-TON HMS and FLOT MILL met grade & acid grade fluorspar
CRYSTAL MILL, acid, ceramic & met fluorspar, zinc & lead concentrate
Mill Frm; James Frailey
Met: D C Spees
VICTORY MINE, Rt 1, Elizabethtown, undergr, CaF_2
Prod: 300 tons
JEFFERSON MINE, Rt 4, Golconda, undergr, CaF_2
Frm: Ray Stone
Prod: 100 tons
ROSE CREEK MINE, near

Herod, undergr, CaF_2
No Prod
BENZON MINE (lease) Rt #1 Elizabethtown, undergr, open pit, CaF_2
No Prod
GASKINS MINE, Empire dist, Pope Co, undergr, CaF_2
No Prod
FAIRBAIRN MINE, 6 mi W of Rosiclare, undergr, CaF_2
Frm: Harry Gibbs
Under devel
(See Mo)

MORTON SALT CO
110 N Wacker Dr, Chicago
Pres: Daniel Peterkin
VP: Herbert Stratford
R C Vail
Sec: L M McBride
Treas: W Hasler
Purch Agt: N L Esthus
(See Kan, La, Ohio, Tex)

NEW JERSEY ZINC CO, THE
SMELTER, Depue, Zn
Supt: P A Jensen
(See Colo, NJ, N Mex, NY, Pa, Tenn, Va, Wisc)

OZARK-MAHONING CO, MNG DIV
Box 57, Rosiclare
Pres: C O Anderson
VP& Gen Mgr: A G Johnson
Purch Agt: C W Sobosky
DEARDORFF, W L DAVIS #3, NORTH GREEN, EAST GREEN, WEST GREEN, MAHONING MINES, SHAFT #2, 3, 5, 11, 16 & HILL-LEDFORD, undergr, Zn, Pb, fluorspar
Mine Supt Edward Powell, Jr
Asst Mine Supt: Wm H Melcher
Mine Frm: J H Scott, J L Price
Prod: 500 tons
500-TON FLOT MILL, at mine
Mill Supt W W Fowler
Asst Mill Supt R H Herman
Mill Frm: P N Hobbs
Assay. Wm Smith
(See Colo, N Mex, Okla)

ROSICLARE LEAD & FLUORSPAR MNG CO
Rosiclare
Pres: J Blecheisen
VP: Bruce Baird
Sec-Treas Herman G Lauten
ROSICLARE MINE, undergr, fluorspar
Master Elec. P E Howard
300-TON FLOT HEAV MED MILL, at mine
(See Ky)

SILVER MOUNTAIN MNG CO
5202 Ronald Rd, Peoria
Pres: D J Risser
VP: R G Hazzard
Sec. J M Risser
Treas. D J Risser
(See Colo)

SWIFT & COMPANY
Union Stockyards, Chicago
(See Fla)

TRI-STATE ZINC, INC
123 William St, New York 38, New York
Pres R F Playter
VP V C Allen
Sec-Treas. J H Nicholls
GRAY MINE OPERATION, Galena, undergr, Zn, Pb
Gen Mgr: V C Allen
Gen Supt George R Schaefer
Mine Supt. Orville W Lickes
Mine Eng: R J Kuehneman
Prod: 1, 050 tons
1, 050-TON FLOT-GRAV MILL, Galena
Mill Supt Homer Baker
(See NY, Va)

U S GYPSUM CO
300 W Adams St
Chicago 6, Ill
Chrm Bd: C H Shaver
Pres: G J Morgan
VP, Op: E Rembert
VP, Manu: C W Desgre,
Sec-Treas: F L Stellner
Dir, Purch: G H Huntley
Mgr Mines: F C Appleyard
(See Calif, Colo, Conn, Ind Iowa, Mass, Mich, Mont, N Mex, NY, Ohio, Okla, Tex, Utah, Va)

VICTOR CHEMICAL WORKS (DIV OF STAUFFER CHEMICAL CO)
155 N Wacker Dr, Chicago 6, Ill
Pres & Gen Mgr: Rothe Weigel
VP: F M Anable, D G Brower
M R Stanley
Treas: F S Schwerdt
Purch Agt: M E Jones
(See Mont)

ZONOLITE COMPANY
135 S La Salle St, Chicago 3, Ill
Pres & Treas: J A Kelley
VP: Robert W Sterett
Sec: J H Bishop
Purch Agt: Leo O Franz
(See Mont)

INDIANA

GENERAL REFRACTORIES CO
1520 Locust St, Philadelphia 2, Pa
QUARRY, near Shoals, quartz pebble
Quarry Supt: William Steckmann
(See Ga, Pa)

NATIONAL GYPSUM CO
325 Delaware Ave, Buffalo 2, NY
MINE, Shoals, undergr, gypsum
Plant Mgr: M Abrams
Mine Supt: P Haag
Prod: 1, 300 tons
MILL, at mine
(See Ariz, Iowa, Kans, Mich, NY, Pa, Tex, Va)

PLATEAU IRON ORE CORP
711 Hulman Bldg
Evansville 8
Pres Ira Van Tuyl
VP. A S McGregor
Sec.: E C Robinson
Treas & Purch Agt: Roy Pledger
(See Mo)

U S GYPSUM CO
300 W Adams St, Chicago 6, Ill
MINE, Shoals, Undergr, gypsum
Works Mgr. J R Burns
(See Calif, Colo, Conn, Ill, Iowa, Mass, Mich, Mont, Ohio, N Mex, Ny, Okla, SD, Tex, Utah, Va)

IOWA

BESTWALL GYPSUM CO
Box 768, Fort Dodge
MINE, open pit, gypsum
PLANT, at mine
Gen Mgr. H J Zelms
Asst Gen Mgr: J B H Fitzwilliam
Mech Eng: F M Fennessy
Mine Supt: J Christians
Mine Eng: J Graham
(See Kan, Mich, NY, Pa, Tex, Utah)

THE CELOTEX CORP
120 S La Salle St, Chicago, Ill
MINE, RFD 4, Fort Dodge, gypsum
Mine Supt: Richard Holm
(See Ill, Tex)

DOUDS STONE CO
Douds
MINE, undergr, limestone

FORT DODGE LIMESTONE CO
522 S 22nd St, Fort Dodge
Pres: Robert Welp
MINE, undergr, limestone

NATIONAL GYPSUM COMPANY
325 Delaware Ave, Buffalo 2, NY
QUARRY, Fort Dodge, gypsum
Plant Mgr: J H Carter
Quarry Supt: W Canney
Prod: 1, 400 tons
MILL, at quarry
(See Ariz, Ind, Kans, Mich, NY, Pa, Tex, Va)

U S GYPSUM CO
300 W Adams St, Chicago 6, Ill
OPEN QUARRY, Fort Dodge, gypsum
Works Mgr: M E Davidson
MINE, Sperry, Des Moines Co, undergr, gypsum
(See Calif, Colo, Conn, Ill, Ind, Mass, Mich, Mont, Ohio, N Mex, NY, Okla, SD, Tex, Utah, Va)

KANSAS

AMERICAN SALT CO
630 New York Life Bldg
Kansas City 5, Mo
MINE, Lyons, salt

B & I MNG COMPANY
Box 305, Picher, Okla
FLORENCE HARTLEY MINE, Zn, Pb
Supt: Otis Burns
No Prod

BARTON SALT CO
1st National Bank Bldg
Hutchinson
Pres: B L Humphreys
VP: R S Humphreys
Sec. C R Allan
Treas: Elizabeth H Summers
BARTON SALT PLANT, Cleveland & Campbell
hydraulic mng, salt
Plant Mgr. R S Humphreys
Asst Supt: M H Wambsganss

BESTWALL GYPSUM CO
120 E Lancaster Ave
Ardmore, Pa
MINE, Blue Rapids, undergr, gypsum
(See Iowa, Mich, NY, Pa, Tex, Utah)

BREWSTER LEASE MNG CO
c/o Mr Tucker,
PO Box 464,
Baxter Springs
MINE, Pb, Zn
Under devel

CAREY SALT CO
Box 913, Hutchinson
Pres. H J Carey, Jr
VP: W D P Carey
VP, Oper. S B Horrell
Sec: D P Johnston
Treas: R N Apple
Purch Agt. F L Johnson
MINE, Hutchinson, undergr, salt
Gen Mgr. Leo Reid
Mech Eng: Ronald Stone
Mine Supt: Everett Roberts
Prod: 1, 000 tons
1, 000-TON GRAV MILL, Hutchinson
Mill Supt: C Millard
(See La)

THE EAGLE-PICHER CO, CHEMICALS& METALS DIVISION
Mng Branch & Tri-State Mines Office, Cardin, Okla
BILHARZ, GRACE B, WEBBER, WESTSIDE, BALLARD, BIRD DOG MINES
undergr, Zn, Pb
No Prod
LEAD SMELTER & ACID PLANT, Galena
Mgr: Fred Clearman
(See Ill, Nev, Ohio, Okla, Wisc)

HAWKINS, O H
1857 N 30th St, Kansas City 4
(See Colo)

INDEPENDENT SALT COMPANY
4115 Packers Avenue
Chicago, Ill
SALT MINE, Kanopolis, undergr

KERFORD, GEORGE W QUARRY COMPANY
415 Utah Ave, Atchison
Pres: Geo Ed Kerford
VP-Treas: Lloyd Kerford, Jr
Sec: Orland Barnett
Chmn of Bd: Lloyd Kerford
WORKINGS, undergr, open pit, limestone,
Gen Supt: Frank Levell
Supt of Maint: J N Hicks
Prod: 500 tons

M & B MINING CO
J D Merit, PO Box 216, Cardin, Okla
GOLDEN ROD #24 MINE, Pb, Zn

MID-CONTINENT LEAD & ZINC MNG CO
Childress & Milligan, Baxter Springs
LUCKY JEW & BIG JOHN MINES, Pb, Zn

MORTON SALT CO
110 N Wacker Dr
Chicago 6, Ill
SALT MINE, Hutchinson, evapor salt
Gen Plant Mgr: R E Berry
Asst Plant Mgr: D E Bucher
(See Ill, La, Tex)

NATIONAL GYPSUM CO
325 Delaware Ave, Buffalo 2, NY
MINE, Sun City, undergr, gypsum
Plant Mgr: L F Gilmore
Mine Frm: M Svoboda
Prod: 1, 000 tons
MILL, Medicine Lodge
(See Ariz, Ind, Iowa, Mich, NY, Tex, Va)

NATIONAL LEAD COMPANY
Fredericktown, Mo
BALLARD MINE, Cherokee Co, Pb, Zn
DE LORE DIV, 2800 Carondulet St, St Louis, Mo, mine, Wallace Co, diatomaceous mari
(See Ark, Calif, Colo, La, Mo, Mont, Nev, Tenn, Tex, Utah, Wyo)

ORA-BLACK CO
Cardin, Okla
LINDSEY MINE, Cherokee Co, Pb, Zn

PAWNEE SALT CO
Great Bend
MINE, Barton County

REA, C H
Baxter Springs
ROBINSON MINE, Cherokee Co, Pb, Zn

SEARCY & HENDERSON MNG CO
Box 281, Picher, Okla
BENDELARI MINE, NW of Picher, undergr, Zn
WILBUR MINE, near Treese, undergr, Zn, Pb
No Prod
STOSKOPF MINE, Zn, Pb
Supt: D W Searcy

TUCKER & HENDERSON MNG CO
Picher, Okla
Bookkeeper: W A Brewer
MINE, Pb, Zn

ZUVEKAS MNG & MLG COMPANY
Baxter Springs
Own: Clarence Zuvekas
MINE, Oklahoma
MILL, Kansas, Pb, Zn
(See Okla)

KENTUCKY

ALUMINUM CO OF AMERICA
SHOUSE MINE, Joy
Livingston County, CaF_2
No Prod
(See Ark, Ill, Pa)

ANACONDA ALUMINUM CO
1430 S. 13th St,
Louisville 1, Ky
Pres: A P Cochran
Exec VP. M Lewis
Sec-Treas: E C Tatgenhorst
(See Montana)

ATWOOD MNG CO
Salem
MINE, CaF_2

BOURBON MNG CO
Marion
GOERING MINE, CaF_2

CALVERT CITY CHEMICAL CO
Box 305, Calvert City, Ky
DYER'S HILL MINE, CaF_2

CRAIGHEAD & COATES
Marion
STALLIONS MINE, CaF_2

CRAVENS, JAMES H
Princeton
TYREE MINE, CaF_2

CRIDER, J WILLIS, FLUORSPAR CO
Marion
PIGMY MINE, $BaSO_4$

KENTUCKY FLUORSPAR CO
Marion
Pres and Treas. R N Frazer
VP-Sec: E W Frazer
Purch Agt: E W Frazer
TWO 100-TON FLOT MILLS, Marion & Rosiclare, Ill
TWO HEAV-MED MILLS Marion & Rosiclare, Ill
Mill Supt: W Matthews
Assayer: C L Frazer

MICO MNG & MLG CO
RR #6, Marion
Pres: Albert Ballenson
Sec: Birdie Kornblum
MINE, barite, open pit
Gen Mgr. J Shoemaker
Geol: B J Squire
Prod: 800 tons raw feed
800-TON GRAV MILL, Marion

ROSICLARE LEAD & FLUORSPAR MNG CO
Rosiclare, Ill
PIGMY MINE, Crittenden County, undergr, CaF_2
Prod: 50-75 tons
(See Ill)

TINSLEY & LOYD
Marion
NANCY HANKS MINE, CaF_2

LOUISIANA

CAREY SALT CO
Winnfield
MINE, Winnfield, undergr, salt
Mgr: W H Cameron
Supt: Al Tracy
Mech Eng: J M Thornton
Mine Frm: J E Austin
Prod: 600 tons
MILL, at mine
(See Kans)

DIAMOND CRYSTAL SALT CO
St Clair, Mich
Pres: C F Moore
VP: R D Rudolph
Sec: E P Wright
Treas: J C Cobourn
Purch Agt: R W Klecha
JEFFERSON ISLAND MINE, Jefferson Island, undergr, rock salt
Gen Mgr: G S Barber

Asst Gen Mgr & Mine Supt: N Nicola
Gen Supt: R B Sonnier
Geol: E Waugespack
Mech Eng: E Allain
Asst Mine Supt: V Adams
Mine Frm: E Leblanc
Mine Eng: A Marcotte
Prod: 4,000 tons

FREEPORT NICKEL CO
Commerce Bldg, New Orleans
REFINERY, Port Nickel
No Prod

FREEPORT SULPHUR CO
161 E 42nd St, New York 17, NY
LOUISIANA DIV, Commerce Bldg, New Orleans, mines at Grande Ecaille, Garden Island Bay, Chacahoula, Lake Pelto, Grand Isle
Purch Agt: S Mayo
(See NY)

INTERNATIONAL SALT COMPANY
Clarks Summit, Pa
Pres: Edward L Fuller
VP: John L Ryon
Exec VP & Sec: Hervey J Osborn
VP & Treas: Mortimer B Fuller, Jr
Purch Agt: Louis H Healy
Dir of Prod: F G Parrish
AVERY ISLAND MINE & REFINERY, Avery Island, undergr, rock salt (halite)
Mgr: Erland Johnson
Asst Mgr: E P Terrell, Jr
Supt: Lester L Jay
Plant Eng: L J Comeaux
Elec Eng: John C Boyer
Purch Agt: J M Delcambre
Pers Mgr: L J Theilgard
Mine Frm: Lawrence Hebert
Prod: 1,700 tons
(See NY, Mich, Pa)

KAISER ALUMINUM & CHEMICAL CORP
Kaiser Center, 300 Lakeside Drive, Oakland 12, Calif
Pres: D A Rhoades
VP: T J Ready, Jr
Sec: William Marks
Treas: R A Clayton
VP, Purch, Adv & Pub Rel: Fred J Drewes
PLANT, Baton Rouge, alumina
Prod: 850,000 tons yrly
PLANT, Gramercy, alumina
Prod: 430,000 tons yrly
(See Calif)

JEFFERSON LAKE SULPHUR COMPANY
1408 Whitney Bldg, New Orleans 12
Pres: Eugene H Walet, Jr
VP, Frasch Sulphur Plants: Harvey A Wilson
VP-Sec: Charles J Ferry
VP-Treas: L L Lasvalle
Purch Agt: Carl McElrath
STARKS DOME MINE, Vinton, sulphur
(See Calif, Tex)

MILWHITE MUD SALES CO
3820 Essex Lane, Houston 27, Texas
Pres: George Conner
Exec VP: H R Wells
Gen Supt, Prod, & Properties: R A Woolford
DRY GRINDING MILL, New Orleans, barite
Plant Supt: R H Heffelfinger
Asst Plant Supt: T J Wallbillich
(See Mo)

MORTON SALT CO
110 N Wacker Drive Chicago 6, Ill
MINE, Weeks, Salt
Gen Mgr: L J Broussard, Jr
Asst Gen Mgr: Wayne West
Prod: 2,500 tons
(See Ill, Kans, Ohio, Tex)

NATIONAL LEAD CO
BAROID DIVISION
New Orleans
BARITE PLANT, dry grinding
Plant Supt: D M Middleton
(See Ark, Calif, Colo, Kans, Mont, Mo, Nev, NY, Tenn, Tex, Wyo)

ORMET CORP
Burnside
PLANT, Burnside, alumina
Prod: 345,000 tons yrly
(Joint ownership by Olin Mathieson Chem Corp & Revere Copper & Brass, Inc)

MAINE

BEERS, ROLAND F, COMPANY, INC
Troy, NY
Pres: R F Beers
Res Mgr: D E Wyke
MINE, Crawford Pond Development, Me
Under devel

BELL MINERALS CO
West Paris
PERHAM MINE, Oxford County, feldspar
Gen Supt: D O Ring
GRINDING MILL, feldspar

INTERNAT'L MIN & CHEM CORP
5401 Old Orchard Rd, Skokie, Ill
MINES, Sagadahoc Co, feldspar
50-TON MILL, Topsham
Gen Supt: J C Brannigan
(See Ariz, Fla, Ill, Miss, N Mex, NC, SD, Tenn, Va, Wyo)

MAINE MICA CO
Spruce Pine, North Carolina
WARDWELL MINE, Albany, mica
MILL, Spruce Pine North Carolina
(See NC)

PENOBSCOT MNG CORP
Harborside, Brooksville
Pres: C H E Stewart
VP: K D Thomson
Sec: D C Marshall
CAPE ROSIER MINE, undergr, Cu, Zn, Ag
Gen Mgr: K D Thomson
Under devel

PORTLAND-MONSON SLATE COMPANY
465 Congress St, Portland
Gen Mgr: Dan E Edgerton
MINES, Monson, Piscataquis County, undergr
MILL, Monson, elec slate

ROCKLAND-ROCKPORT LIME CO, INC
PO Box 339, 457 Main St Rockland
Pres-Purch Agt: A E Orff
Treas: C C Douglas
MINES, Knox County, open pit, limestone
Mine Supt: David R Hoch
Asst Mine Supt: Donald K Bickford
Prod: 400 tons
MILL, Rockland
Mill Supt: David R Hoch
Asst Mill Supt: Karl T Hurd

TOPSHAM FELDSPAR CO
Topsham
Pres: E W Booker
Gen Supt: D R Direnzo
TRENTON MINE, Sagadahoc County, feldspar, quartz
Under devel
50-TON GRAV MILL, Cathance Rd, Topsham

MARYLAND

AMERICAN SMELTING & REFINING COMPANY
Highland & Eastbourne Aves Baltimore 24
BALTIMORE PLANT
Mgr: A J Kieff, Jr
(See Ariz, Calif, Colo, Idaho, Ill, Mont, Nebr, NJ, N Mex, NY, Tex, Utah, Wash)

CLINCHFIELD SAND & FELDSPAR CORP
413 Washington Ave Towson 4
MINE, Marriottsville, Talc
(See NC)

W R GRACE & CO DAVISON CHEMICAL DIVISION
101 N Charles St, Baltimore 3
Chmn: C F Hockley
Pres: W E McGuirk, Jr
VP: D N Hauseman, W N Watmough, R Goodall
(See Fla)

HARFORD TALC & QUARTZ CO, INC
Bel Air
Pres: E L Dinning, Jr
MINE, Dublin, asbestos, talc

KAYLORITE CORP
Dunkirk
MINE, Lyons Wharf, glauconite

KENNECOTT REFINING CORP
Baltimore
ELECTROLYTIC COPPER REFINERY, Anne Arundel Co
Cap: 16,500 tons mnthly
(See Kennecott Copper Corp, Ariz, Nev, N Mex, NY, Utah)

LIBERTY STONE CO
Sykesville
MINE, Marriottsville, talc

MARYLAND LAVA CO
Box 205, Bel Air
MINE, Dublin, talc

NORTH AMERICAN CEMENT CORP
41 E 42nd St, New York 17, NY
MINE, Security, Washington County, potash

POWHATAN MNG CO
6721 Windsor Mill Rd Baltimore 7
Pres-Gen Mgr: Fred A Mett
VP-Sec: C Silver
Treas: Frances E Mett
Office Mgr: F E Mett
MICAVILLE MINE, Micaville, asbestos
Mine Supt: Frank Burleson
Prod: 15 tons
(See Calif, Ga, NC)

UNITED CLAY MINES CORP
Poplar
MINE #2, open pit, ball clay
Mine Supt: H Michael Breza
MILL, at mine
(See Fla, Ga, NJ, SC, Tenn)

MASSACHUSETTS

COPPER RANGE CO
24 Federal St, Boston 10, Mass
Chmn: J P Lally
Pres: James Boyd
VP: John V O'Connor, Robert H Jacobson, Wm P Nicholls
Sec: J R Ackroyd
Asst Sec: W Peter Carey
Treas: D M Goodwin
Purch Agt: S H Bailey
(See Mich, White Pine Copper Co, Mich & Mass)

U S GYPSUM CO
300 W Adams St, Chicago 6, Ill
QUARRY, Farnams, open pit, limestone
Works Mgr: E E Long
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mich, Mont, Ohio, Okla, N Mex, NY, Tex, Utah, Va)

U S SMELTING, REFINING & MNG CO
75 Federal St (Box 2137) Boston 6
Pres: C G Rice
Sr VP: J George Gange
VP, J B Metcalfe
(See Alaska, Ariz, N Mex, Utah)

WHITE PINE COPPER CO
24 Federal St, Boston
Pres: W P Nicholls
VP: Robt H Jacobson, L A Garfield, G D Weaver
Chmn & Princ Exec Opr: James Boyd
Sec: J R Ackroyd
Asst Sec: W Peter Carey
Treas: D M Goodwin
Purch Agt: Russell Baird
(See Copper Range Co, Mich, & White Pine Copper, Mich)

MICHIGAN

BESTWALL GYPSUM CO
120 E Lancaster Ave Ardmore, Pa
MINE, Grand Rapids, gypsum, undergr,
(See Iowa, Kans, NY, Pa, Tex, Utah)

CALUMET & HECLA, INC, CALUMET DIV
Calumet
Pres & Gen Mgr: Paul Dashine
Cont: B C Peterson
Dir of Purch: W A Barz
Dir, Emp & Pub Rel: H D Stott
AHMEEK #2, PENINSULA, ALLOUEZ, CENTENNIAL #2, SENECA MINES, undergr, Cu
Prod: 6,000 tons
CENTENNIAL #3, & OSCEOLA #13 MINES, Undergr, Cu
Under devel
Mgr Mng: J Lasio
Chief Geol: J P Pollock
Eng Mgr: P H Ostlender
Elec Eng: A W Hill
6,000-TON GRAV-FLOT MILL, Hubbell
Mill Supt: L C Klein
Gen Mill Frm: A W Greif
REVERB SMELTERS, Hubbell
Dir, Metals Processing & Fabrication: K F Farley
Prod: 120,000,000 lbs refined Cu yrly

CLEVELAND CLIFFS IRON CO, ORE MNG DEPT
1460 Union Commerce Bldg, Cleveland 14
Chmn Bd: Walter A Sterling
Pres: H S Harrison
VP: Hugh J Leach
VP, Mining: J S Westwater
Sec: Robert M Kimmel
Treas: J P Long
MICHIGAN OPER, Ishpeming
Mgr, Mich Mines: H C Swanson
Mgr, Ore Devel: S W Sundeen
BUNKER-HILL-MAAS MINE, Marquette County, undergr, Fe
Supt: Gilbert A Dawe
CLIFFS SHAFT, Marquette County, undergr, Fe
Supt: Onnie Marjama
MATHER MINE, Marquette County, undergr, Fe
Supt "A" Shaft: T A Kauppila
Supt "B" Shaft: A J Andelin
TILDEN MINE, Marquette County, surface, Fe
Supt: K C Olson
HUMBOLDT MINE, Marquette County, surface, Fe
Supt: K C Olson
REPUBLIC MINE, Marquette County, surface, Fe
Supt: E W Lindroos
RESEARCH LAB, Marquette County, Ishpeming
Ch Met: L J Erck
Proj Eng: D K Campbell
PELLETIZING PLANT, Marquette County
Supt: H W Rembold
ORE IMPROVEMENT PLANT, Marquette Co
Supt: Robert DeGabriele
(See Minn, Ohio)

COPPER RANGE CO
24 Federal St, Boston 10, Mass
CHAMPION MINE, Painesdale, undergr, Cu
Gen Mgr: Henry Combellack
FLOT MILL, Freda
Supt: John Harris
(See Mass & White Pine Copper Co)

GRAND RAPIDS GYPSUM CO
PO Box 74, Grand Rapids
Pres: William C Chick
Exec VP: Donald G Slawson
Sec: Walter W Wennerstrom
Treas: Donald G Slawson
Purch Agt: Donald F Williams
EAGLE MILLS MINE, gypsum
Gen Mgr: Donald G Slayson
Gen Supt: George I Fischer
Mech Eng: Paul E Hathway
Mine Supt: Charles P Young
Mine Frm: Orval Sexton
900-TON MILL, Kent Co
Mill Supt: George I Fischer
Mill Frm: Newton A Johnson
Cap: 900 tons stucco

HANNA IRON ORE DIV NATIONAL STEEL CORP
Iron River
Gen Mgr: R W Whitney
Mgr, Mich Mines: W F Shinners
Gen Supt: K R Kuehlthau
Dist Geol: P W Zimmer
Mech Eng: Warren W Jamar
Elec Eng: Carl W Anderson
Purch Agt: G E Tromblay
CANNON MINE, Stambaugh, undergr, Fe
Mine Supt: G A Koehler
Mine Capt: H Krans
Prod: 2,500 tons
HIAWATHA MINE, Iron River, undergr, Fe
Mine Supt: J R Quayle
Mine Capt: W Lundwall
Prod: 2,000 tons
HOMER MINE, Iron River undergr, Fe
Mine Supt: J D McAuliffe
Mine Capt: G Johnson
Prod: 2,400 tons
(See Minn, Ohio, Mid-West Ore Co, Mo)

HANNA MNG CO, THE
Iron River
Gen Mgr: R W Whitney
Mgr, Mich Mines: W F Shinners
Gen Supt, undergr mines: K R Kuehlthau
Gen Supt, open pit mines: E W Geist
Dist Geol: P W Zimmer
Mech Eng: Warren W Jamar
Elec Eng: Carl W Anderson
Purch Agt: G E Tromblay
WAUSECA MINE, Undergr, Fe
Mine Supt: J D McAuliffe
Mine Capt: J Bocick
Prod: 2,400 tons
GROVELAND MINE, Randville, open pit Fe
Mine Supt: F H Lee
Gen Mine Frm: C Peterson
Prod: 2,000 tons
4,000-TON MILL, Randville
Mill Supt: D Smith
(See Minn Ohio, Midwest Ore Co., Mo)

INLAND STEEL CO, IRON ORE OPER
424 S Pine St, Ishpeming
Pres: John F Smith, Jr
VP, Raw Mat: Carl B Jacobs
Treas: W H Lowe
Sec: Graydon Megan
GREENWOOD MINE, Ishpeming, undergr, Fe

SHERWOOD MINE, Iron River, undergr, Fe
BRISTOL MINE, Crystal Falls, undergr, Fe
Gen Mgr, Ore Mines: R D Satterley
Mgr, Ore Mines: P D Pearson
Ch Geol: A T Broderick
Mech Eng: J R Gronseth
Ch Mng Eng: D E Brown
(See Ill, Minn)

INTERNATIONAL SALT COMPANY
Clarks Summit, Pa
Pres: Edward L Fuller
VP: John L Ryon, Sr
Sec: Hervey J Osborn
Treas: Mortimer B Fuller, Jr
Purch Agt: Louis Healy
DETROIT MINE, 12841 Sanders St, Detroit 17, undergr, rock salt
Gen Mgr: Leo E Read
Asst Gen Mgr: Frederick W Pfau
Gen Supt: Roy W Yokley
Geol: Richard J Lark
Mine Frm: Robert E Thomas
Mine Eng: James A McDonald
MILL, Detroit
Mill Supt: Roy Yokley
Prod: 4,000 tons salt
See La, NY, Ohio, Pa)

JONES & LAUGHLIN STEEL CORP, MICHIGAN ORE DIVISION
Negaunee
TRACY MINE, Undergr, Fe
Mgr: R W Braund
Supt: R L Balconi
Mech Eng: Michael Kerecman
Elec Eng: John B Motto
Mine Frm: R L Prideaux
Mine Eng: Wm A Benson
(See Minn, NY, Pa)

THE METRO-NITE CO
3523 W Silver Spring Dr
Milwaukee 9, Wisc
MINE, Felch, dolomite, undergr, open pit

MICHIGAN CHEMICAL CORP
500 N Bankson, St Louis
Pres: Theodore Marvin
VP: Dr C B Hollabaugh
Sec-Treas: R J Knapp
Purch Agt: N A Gibbs
Dir, Rare Earths & Thorium Div: Dr A M Gammill
ELECTROLYTIC ION EXCHANGE PLANT for rare earth production, St Louis
Supt: E M Laczynski
Asst Supt: Glen Martin
Assay: J Mosier
No Prod

NATIONAL GYPSUM CO
325 Delaware Ave, Buffalo 2, NY
QUARRY, Tawas, gypsum
Plant Mgr: J B Pitts
Quarry Supt: A Birkenbach
Prod: 3,000 tons
MILL, National City
(See Aris, Ind, Iowa, Kans, NY, Pa, Tex, Va)

NORTH RANGE MNG CO
Negaunee
Pres: F P Book
Chmn Bd: R S Archibald
VP: R Archibald
Cons Engr: F J Haller
Sec-Treas: E S Holmgren
Ch Elec: G H Peterson
Gen Supt: J C Kirkpatrick
Purch Agt: J M Archibald
BOOK MINE, Alpha
No Prod
Mill Supt: J E Hayden
CHAMPION MINE, Champion, undergr, Fe
Supt: R L Sundeen
PENOKEE, Ironwood, undergr, Fe
Supt: J Zuraw
Capt: Wm Bianchi
(See Minn)

PICKANDS MATHER & COMPANY (Managing Agts)
700 Sellwood Bldg
Duluth 2, Minn
THE MAUTHE MNG CO, GENEVA & NEWPORT MINES, Ironwood, undergr, Fe
Supt: A L Johnson
Asst Supt: A J Cigallio
PURITAN MNG CO, PETERSON MINE, Bessemer undergr, Fe
Supt: J C Wangaard
Asst Supt: L G Woodworth
SUNDAY LAKE IRON CO, SUNDAY LAKE MINE, Wakefield, undergr, Fe
Supt: R D Hodge
VERONA MNG CO, BUCK MINE, Caspian, undergr, Fe
Supt: C D Bailey
LAWRENCE MINE, Caspian, undergr, Fe
No Prod
CORNELL MNG CO, CORNELL MINE, Iron Mtn, open pit, Fe
No Prod
(See Minn, Wisc)

THE QUINCY MNG CO
Hancock
FLOT MILL, Torch Lake, reclamation plant, Cu

REPUBLIC STEEL CORP
Gen Ofc: Republic Bldg, Cleveland 1, Ohio
Pres: T F Patton
VP, Operations: H L Allen
Sec: W B Belden
Treas: W B Boyer
Purch Agt: W T Adams
Dist Ofc: 307 Sellwood Bldg, Duluth 2
Dist Mgr: S C Howell
Ch Mech & Elec Eng: I V Crego
TOBIN-COLUMBIA-MONONGAHELA MINE, Crystal Falls, undergr, Fe
Mine Supt: J H Torreano
Mine Frm: Emil Johnson
Ch Chem & Ore Grader: F A Mayheu
Prod: 250,000 tons yrly
(See Ala, Minn, NY, Ohio)

U S GYPSUM CO
300 W Adams St, Chicago 6, Ill
QUARRY, Alabaster, open pit, gypsum
Works Mgr: M H Van Ornum
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mont, Ohio, Okla, N Mex, NY, Tex, Utah, Va)

WHITE PINE COPPER CO
24 Federal St, Boston 10, Mass
Pres: William P Nicholl
VP: Robert H Jacobson
L A Garfield, G D Weaver
Chmn & Princ Exec Opr: James Boyd
WHITE PINE MINE, White Pine, undergr, Cu
Gen Mgr: William P Nicholl
Asst Gen Mgr: G D Weaver
Geol: Dr E L Ohle
Met: Virgil L Lessels
Mech Eng: G F Haberlen
Elec Eng: R W Brusenbeck
Mine Supt: A J Francovich
Ind Rel Dir: Bill E Christian
15,000-TON FLOT MILL, White Pine
Mill Supt: Ross E Gamble
REVERB SMELTER, White Pine
(See White Pine Copper Co, Mass, Copper Range Co, Mass)

WYANDOTTE CHEMICAL CORP
1609 Biddle Ave, Wyandotte
(See Calif, Miss)

MINNESOTA

ARCHER-DANIELS-MIDLAND CO
700 Investors Bldg, Minneapolis, Minn
(See Wyo)

CLEVELAND-CLIFFS IRON CO, ORE MNG DEPT
1460 Union Commerce Bldg, Cleveland 14, Ohio
Bd Chmn: Walter A Sterling
Pres: H S Harrison
VP: D R Forrest
VP, Mng: James S Westwater
VP, Ore Sales & Marine: J S Wilbur
VP, Foreign Op & Ore Research: H J Leach
Sec: R M Kimmel
Treas: J P Long
MINNESOTA OPER, 2031 E 2nd Ave, Hibbing
Mgr, Minn Mines: J J Foucault
HAWKINS MINES, Nashwauk, surface
WASH & HMS PLANT
Supt: William LeClair
HILL-TRUMBULL MINE
Marble, open pit
WASH & HMS PLANT, Calumet
Supt: M L Viant
HOLMAN-CLIFFS MINE, Coleraine, open pit
WASH & HMS PLANTS, Coleraine
Supt: A E Hill
CANISTEO MINE, Coleraine, open pit
WASH & HMS PLANT
Supt: Ronald Pearson
SALLY MINE, Coleraine, open pit
(See Mich, Ohio)

COONS PACIFIC CO
Box 27, Eveleth
Pres: H H Harrison
Supt: R B Hurd
CUSTOM IRON ORE CONCEN 8,000-TON GRAV-HEAVY MEDIA MILL, Eveleth

ERIE MNG CO (Managed by PICKANDS MATHER & CO)
Hoyt Lakes
(Owned by: Youngstown Sheet & Tube Co, Interlake Iron Co, Steel Company of Canada, Ltd, Bethlehem Steel Co)
MINE, open pit, taconite
CRUSHING, CONCENTRATING & PELLETIZING PLANT
Asst Wrks Mgr, Service: J H Healy & B F Borgel
Supt, Ore Dressing: H P Whaley
Supt, Agglomerating: F P Morawski
Supt, Mng: W L Thomte
Asst Supt Mng: J E Schelske
Supt, Railrd & Harbor: P F Giesking
Supt, Power Plnt: R E Peck
Supt, Maint: B D Mull
Supt, Plant Improvement: K R Groll
(See Pickands Mather & Co Mich, Minn, Ohio, Wisc)

HALEY-YOUNG MNG CO
2223 First Ave, Hibbing
Pres: E A Young
Sec-Treas: David D Haley
ELBERN MINE, 2 mi SE of Fraser, surface, Fe
Supt: Leo Cashen
Frm: Michael Molick
(See Young, E A, Inc, Minn)

M A HANNA COMPANY
1300 Leader Bldg, Cleveland 14, Ohio
M A HANNA COMPANY, AGENTS
2125 2nd Ave E, Hibbing, Crosby & Nashwauk
Mgr, Minn Mines: B M Andreas
Asst Mgr, Minn Mines: R C Wallace
Gen Supt, Mesabi Range: F E Dyson
Gen Supt, Cuyuna Range: J E Bemis
Supt, Cooley Group: L D Clover
Supt, Mississippi Group: R M Gross
Supt, Hunner Mine: A G Nelson
Supt, Pierce Group & Weggum Mine: L M Bredvold
Supt, South Agnew Group & Morton Mine: R L Thompson
Supt, Douglas Group: L T Kreuz
Supt, Enterprise Mine: E C Johnson
Supt, Fillmore County Mines: C A Pedersen
Ch Eng: R O Buck
Asst Ch Eng, Hibbing: C J Mell
Asst Ch Eng, Nashwauk: H A Larson
Asst Ch Eng, Crosby: E R Jackson
Claims Mgr: G A Borgeson
Dir, Beneficiation: S E Erickson
The M A Hanna Co is the operating agent for the following nine operating companies:

BUTLER BROTHERS
Hibbing
AROMAC, G-10, HALOBE, HARRISON, NORTH HARRISON, KEVIN, MACE NO 2, OLSON, PATRICK, PATRICK ANNEX, QUINN & SNYDER MINES, Mesabi Range, Fe, Mn
(See Ohio)

DOUGLAS MNG CO
Hibbing
DOUGLAS & DUNCAN MINES, Mesabi Range, Fe
(See Ohio)

HANNA IRON ORE DIV, NATL STEEL CORP
Hibbing
HUNNER MINE, Mesabi Range, Fe

PORTSMOUTH GROUP & ROBERT MINE, Cuyuna Range, Fe
(See Mich, Ohio)

HANNA ORE MNG CO
Hibbing
BRAY, BRUNT, ENTERPRISE, GORDON, GORDON ANNEX, IMPRO RESERVE, MESABI CHIEF, MISSISSIPPI NO 3, NORPAC, NORTH UNO, ROY, SARGENT & WEST ALPENA MINES, Mesabi Range, Fe
(See Ohio)

MIDWEST ORE CO
Hibbing
FILLMORE & MOWER COUNTY PROPERTIES (SPRING VALLEY MINES), Fe
(See Mo)

MORTON ORE CO
Hibbing
MORTON, SOUTH EDDY & CAMPBELL "D" MINES, Mesabi Range, Fe

PHILBIN MNG CO
Hibbing
WEGGUM MINE, Mesabi Range, Fe

SOUTH AGNEW MNG CO
Hibbing
SOUTH AGNEW & AGNEW NO 2 MINES, Mesabi Range, Fe
(See Ohio)

THE HANNA MNG CO (formerly HANNA COAL & ORE CORP)
Hibbing
ARGONNE LEACH & EAST ALPENA MINES, Mesabi Range, Fe
ALSTEAD GROUP & MARTIN MINE, Cuyuna Range, Fe
(See Mich, Ohio & Midwest Ore Co, Mo)

INLAND STEEL CO, IRON ORE OPER
424 S Pine St, Ishpeming, Mich
ARMOUR NO 2 MINE, Ironton, undergr, Fe
Gen Mgr: R D Satterley
Mgr: P D Pearson
Mine Supt: L S Olson
Mine Frm: H Nyberg
Mine Engr: T Tweed
Prod: 1,100 tons
(See Ill, Mich)

JESSIE H MNG CO
Crosby
Gen Supt: R N McGiffert

JESSIE & JESSIE #2 MINES, 3 mi E of Grand Rapids, open pit, Fe
Mine Supt: L R Sewall
Mine Frm: Art Anderson
Mine Eng: J J Walker
Prod: 1,400 tons
2,000-TON MILL, 3 mi E of Grand Rapids

JONES & LAUGHLIN STEEL CORP, MINN ORE DIV
Virginia
Mgr: H F Kullberg
Asst Mgr: R E Durocher
Western Dist Supt: J F Linden
Eastern Dist Supt: P W Kruse
Supt of Maint: D Madich
Ch Acct: T A Parish
Res Eng: W F Gaspar
Ch Mng Eng: T E Stephenson
Ch Ore Dressing Eng: E A Eastman
Supt, Pers Rel: C E Dickens
Mine Ind Eng: L E Hodil
MINES, Mesabi Range, surface, Fe
HILL ANNEX MINE, MILL & TAILING RECLAMATION PLANT, Calumet
Mine Supt: J A Strande
Mill Frm, Conc Plant: L K Lemke
Mill Frm, Reclamation Plant: J S Warren
LONGYEAR MILL & MINE
Hibbing
Dist Supt: J F Linden
Mine Supt: W Ball
LIND-GREENWAY MINE & MILL
Coleraine
Dist Supt: J F Linden
Mine Supt: A C Seaberg
COLUMBIA MINE & MILL, Virginia
Dist Supt: P W Kruse
No Prod
SCHLEY-PETTIT MINE & MILL
Gilbert
Dist Supt: P W Kruse
Mine Supt: A W McWilliams
(See Mich, NY, Pa)

MANGANESE CHEMICAL CORP
Rand Tower, Minneapolis 2, Minn
PLANT, Riverton

W S MOORE CO
400 Torrey Bldg, Duluth
Pres: W S Moore
Sec: H A Nelson
Geol: J V Everett
RANGE OFFICE
425 W Grant St, Hibbing
Gen Mgr: H E Reese
Ch Eng: J M Madsen
Mech Supt: N P Arnold
Gen Plant Frm: W Kinnunen
Office Mgr: R J Kennedy
JUDSON MINE, 1 mi S of Buhl, surface, Fe
JUDSON CRUSHING & SCREENING PLANT
MARISKA MINE, 1 mi NE of Gilbert, surface, Fe
HEAVY MEDIA CONCENTRATOR, ALICE, NORMAN & YAWKEY MINES, Surface, Fe
SCRANTON MINE & HMS PLANT
Hibbing

NORTH RANGE MNG CO
Negaunee, Mich
NAHMA MINE, Eveleth
Supt: R L Mitchell
ZENITH MINE, Ely City
Supt: R L Mitchell
Capt: H C Clark
(See Mich)

OGLEBAY NORTON & CO
1200 Hanna Bldg
PO Box 6508
Cleveland, Ohio
NORTHERN OFFICE, 200 Christie Bldg, Duluth 2

ST JAMES MINING CO,
Aurora
Mgr: Oglebay Norton & Co
ST JAMES MINE, Aurora, surface, Fe
Supt: B L Knudsen
Asst Supt: T E Trihey
Master Mech: Walter Williams
Ch Elec: Edward M Plattner
(See Ohio, Wisc)

PACIFIC ISLE MNG CO
(Subsid of INLAND STEEL CO)
PO Box 37, Mt Iron
(30 W Monroe St, Chicago 3, Ill)
Pres: Carl B Jacobs
VP: R D Satterley
Philip D Pearson
VP & Asst Treas: Henry M Hart, Jr
Treas: W H Lowe
Sec: Graydon Megan
Includes CHATACO MNG CO, COONS PACIFIC CO, HOLLAND MNG CO, PITTSBURGH PACIFIC CO, FAYAL, MISSABE MTN, PEARCE, SHIRAS, SIDNEY, WESSTAR, WYOMING MINES, Fe
No prod from some of these mines
CHATACO, FOWLER-MEADOW, GRAHAM-WENTWORTH, IROQUOIS, JULIA-COMMODORE PLANTS, NORTH UNO CONCENTRATOR
Plant Supt: Jack Durham
COONS PACIFIC CONCEN
Plant Supt: Ralph Hurd
VIRGINIA CONCEN
Plant Supt: Earl Saari
JULIA, MANUEL, ST PAUL WASHING PLANTS
IROQUOIS-WACOOTAH MINE, open pit, Fe
Mine Supt: R J Lacke
Mine Frm: Tony De Nucci
Mine Eng: L Lyngdal
1,500-TON CRUSHING & SCREENING PLANT, at mine
(See Inland Steel Co, Ill, Mich, Minn)

PICKANDS MATHER & CO, INC
600 Sellwood Bldg, Duluth 2
Gen Mgr: E L Joppa
Assoc Gen Mgr: D M Chisholm
Chief Mng Eng: S C Sorenson
Ch Mech Eng: W N Thomas
Purch Agt: W E Weber
Sup of Ind Rel & Safety: E A Anundsen
Asst Gen Mgr, Open Pit Oper: T C Thielman
Admn Asst, Open Pit Oper: B W Stunkard
Asst Gen Mgr, Undergr Oper: F R Werther
Admn Asst, Undergr Oper: W E Seppanen
ERIE MNG CO, Hoyt Lakes, taconite
Mng Supt: W L Thomte
Asst Mng Supt: J E Scheiske
LAKE MNG CO, EMBARRASS MINE, Biwabik
CORSICA IRON CO, CORSICA MINE, McKinley
CRETE MNG CO, ALBANY MINE, Hibbing, undergr
Supt: T R Tregembo
MAHONING ORE & STEEL CO, MAHONING MINE, Hibbing, beneficiation plant, surface
Supt: W D Webb
UTICA MNG CO, WADE MINE, Buhl
No Prod
BENNETT MNG CO, BENNETT MINE, Keewatin, beneficiation plant, surface
BALKAN MNG CO, DANUBE MINE, Bovey, beneficiation plant, surface
Supt: L M Becker
WESTERN MNG CO, WEST HILL MINE, Grand Rapids, beneficiation plant, surface
Supt: R T Bell
WESTERN MNG CO, TIOGA #2 MINE, Grand Rapids, beneficiation plant, surface
Supt: R T Bell
CUYUNA ORE CO, MAHNOMEN MINE, Ironton, beneficiation plant, surface
Supt: H J Stetson
YOUNGSTOWN MINES CORP, RABBIT LAKE MINE, Cuyuna, surface
Supt: H J Stetson
(See Mich, Wisc)

PIONEER MNG CO
Box W, Biwabik
Pres: Frank S Bergstrom
Ch of Bd: Patrick Butler
Sec: F J McArthur
Treas: R J Floeder
MARY ELLEN MINE, 1/2 mi W of Biwabik, open pit Fe
Mine Frm: Frank Press, Jr
Mine Engr: W T Henderson
6,000-TON-HEAV-MED MILL, at mine

PITTSBURGH PACIFIC CO
2521 First Ave, Hibbing
Chmn of Bd: Hugh H Harrison
Pres: E T Binger
Exec VP & Sec: John Boentia
VP & Mgr: Arne Toumala
Treas: Ian F S Pearson
VP & Asst Sec: N E Hill
VIRGINIA AND VIRGINIA EXTENSION MINES, N of Ironton, Cuyuna Range, surface, Fe
4,000-TON VIRGINIA PLANT, Trommald,
MINNESOTA MINES, MANGAN-JOAN MINE, Irondale, Cuyuna Range, surface, Fe
MERRITT LEAN ORE STOCKPILE, Trommald, Cuyuna Range
MANUEL AIRPORT MINE, Crosby, Cuyuna Range, surface, Fe
SAGAMORE MINE, Riverton, Mn, Fe
Prod: 1500 G T
2,500-TON MANUEL PLANT, Crosby

REPUBLIC STEEL CORP
Republic Bldg, Cleveland 1, Ohio
Pres: T F Patton
VP, Oper: H L Allen
Sec: W B Belden
Treas: W B Boyer
Purch Agt: W T Adams
Dist Office: 307 Sellwood Bldg, Duluth 2
SUSQUEHANNA MINE, Hibbing, open pit, Fe
Supt: S V Smith, Jr
(See Ala, Mich, NY, Ohio)

RESERVE MINING CO
Silver Bay
Pres: Robert J Linney
Exec VP: E M Furness
VP & Treas: J Wm Bryant
Sec: J J Dwyer
Purch Agt: E K Smith
Dir of Ind Rel: W L Edwards
Dir of Pub Rel: Edward Schmid
Mgr, Silver Bay Div: E C Lampman
Supt, Pelletizing: D E Cooksey
Asst Supt, Pelletizing: Matthew R Banovetz
Supt, Crushing & Concen: J A Reynolds
Mgr, Babbitt Div: M G Woodle
Asst to Mgr, Babbitt Div: S C Howell
Asst Supt, Mng Dept, Babbitt: Raymond J Bertie
Staff Mng Eng: Joseph Pastika, Jr
PETER MITCHELL MINE, Babbitt, open pit, taconite
Mine Supt: F E McIntire
E W DAVIS WORKS, Silver Bay, magnetic separation producing iron ore pellets from taconite rock
Cap: 17,000 tons
BLAST FURNACE

RHUDE & FRYBERGER
Box 778, Hibbing
Part: J O Rhude
TROY MINE, Eveleth, Mesabi Range, open pit, Fe, HMS & JIG PLANT
BOEING MINE, Hibbing, Mesabi Range, open pit, Fe, Wash Pl
CARLSON-NELSON MINE, Cuyuna Range, open pit, Fe
PEARSALL MINE, Mesabi Range, open pit
HMS & JIG PLANT

ST JAMES MNG CO
ST JAMES MINE, Aurora, open pit, Fe
Gen Supt: B L Knudsen
Asst Supt: T E Trihey
Master Mech: W Williams
Ch Elec: Edw Plattner
(See Oglebay Norton Co)

SCHROEDER MNG CO
Box 336, Stewartville
Pres: P E Schroeder
VP: J R Ritchay
KUREGER MINE, near Chatfield, Fillmore Co, Fe
(See Mo)

SKUBIC BROS CO
705 6th Avenue N
Virginia
Pres & Treas: Frank Skubic
VP & Purch Agt: Edward Skubic
VIRGINIA MINE, Eveleth, 1 mi S, surface, Fe
Gen Supt: Edward Skubic
Gen Mgr: Frank Skubic
Elec Eng: Karl Sulentich
Master Mech: C Larry Dahl
12,000-TON-HEAV-MED, at mine, jig, spirals, magnetic sep
Mill Supt: Karl Sulentich

SNYDER MNG CO
1101 Alworth Bldg, Duluth 2
Pres: Wm P Snyder, Jr
VP & Gen Mgr: Fayette Brown, Jr
Sec: W Laird Davis
Treas: John K Foster
Gen Supt: C O Rudstrom
Ch Eng: Rudolph Ekar
Ch Chem: A W Johnson
Mech Supt: Wayne Meadows
Mech Asst: Max Hoag
Comotroller: V O Youngdahl
Purch Agt: Stanley J Hill
Gen Maint Frm: Joe Zobitz
WEBB MINE, Hibbing, open pit, Fe
Mine Supt: T J Barker
Gen Mine Frm: J J Munter
Res Eng: Edward Zobitz
2,000-TON WASHING PLANT
Master Mech: Dick Costanzi
WHITESIDE MINE, Buhl, open pit, Fe
Mine Supt: T J Barker
Gen Mine Frm: Albert Stukel
Res Eng: M J Bobich
Master Mech: F C Hodge
2,600-TON GRAV-MILL, at mine
GODFREY MINE, Chisholm, undergr, Fe
Mine Supt: O A Axelson
Mine Eng: K P Coen
Master Mech: J V Vidmar
(See Pa)

U S STEEL CORP
OLIVER IRON MNG DIV
Wolvin Bldg, Duluth 2
Pres: C F Beukema
Exec VP: W N Matheson
Asst to VP: W E Cotter, Jr
M V Mielke
VP-Admin: R O Hawkanson
Gen Att & Asst Sec-USS: F B Stevens
Att & Asst Sec-USS: H P Clarke
Asst Sec: T O Archer
Treas: R B Davern
Compt: R D Ryan
Asst Compt: G T Bethune
Dir Mineral Dev: N A Moberg
Staff Asst to Dir Mineral Dev: S V Bradley
Mgr Mng Eng: A H Axelson
Mgr Geol Investigation: R W Marsden
Mgr Research: R J Morton
Asst Mgr Research: R L Bennett
Mgr Ind Eng: Q T Martin
Ch Eng: C N Bailey
Asst Ch Eng: C R Burton
Dir Ind Rel: J S Bonte
Sup Ore Movement: F J Perry
Mgr Safety & Compensation: R F Wilson
Mgr Personnel: D V Dodge
Dir of Purch: L L Slabodnik
Asst Dir of Purch: D L Cudmore
MINNESOTA OPERATIONS,
Gen Mgr: J H Hearding, Jr
Asst Gen Mgr: John Chisholm
Mgr Oper, Eastern Area: M E Johnson
Mgr Oper, Western Area: N G Helland
Mgr, Maint: E A Friedman
Supt Maint, Eastern Are: J A Vitzthum
Supt Maint, Western Area: J R Schoenig
Supt Mng Eng: H R Sermon
Asst Supt Mng Eng: R R Wallace
Mgr Beneficiation: A T Koenen
Asst Mgr Beneficiation: K F MacAlpine
Supt Qual Control & Ore Move: I R Lerohl
Ch Ore Grader: M H Hall
Asst Ch Ore Grader: R L Hawkinson
Ch Chem: M O Carlson
ROUCHLEAU MINE, Mesabi Range, surface, Fe
Supt: D Hartley
Asst Supt: D B Muckler
PILOTAC MINE, Mesabi Range, surface, Fe
Supt: I H Rubow
STEPHENS MINE, Mesabi Range, surface Fe
Supt: E V Nelson
Asst Supt: E J Olson
EMMETT EXTENSION & GILBERT MINES, Mesabi Range, surface, Fe
Supt: F D Hoover
PIONEER MINE, Vermilion Range, undergr, Fe
Supt: L E Dick
SOUDAN MINE, Vermilion Range, undergr, Fe
Supt: E M Holmes
ROUCHLEAU SIZING & EXTACA PLANTS
Supt: C W Niemi
Asst Supt: D V Erickson
PILOTAC PLANT
Supt: W A Arpi
HULL-RUST MINE & PLANT, Mesabi Range, Surface, Fe
Supt: E C Silver
Asst Supt: T C Oliver
SHERMAN MINE GROUP, Mesabi Range, surface, Fe
Supt: M J Forsmark
Asst Supt: M D Van Delinder
SHERMAN SIZING PLANT
Supt: W W Beebe
MONROE MINE, Mesabi Range, surface, Fe
Supt: W J McGuire
Asst Supt: E M Gilmore
ARCTURUS MINE & CONCENTRATOR, Mesabi Range, surface, Fe
Supt: H F Bolton
Asst Supt (Concentrator): T O Olson
PLUMMER MINE & CONCENTRATOR, Mesabi Range, surface, Fe
Supt: A F Savage
Asst Supt (Mine): F J Hitchcock
Asst Supt (Concentrator): W L Zeiher
KING MINE & TROUT LAKE CONCENTRATOR, Mesabi Range, surface, Fe
Supt: J H Harrison
Asst Supt (King Mine): L Scipioni
Asst Supt (Concentrator): V V Ahola
(See Ala, Calif, Pa, Tenn, Utah, Wyo)

YOUNG E A INC
2223 First Ave, Hibbing
Pres: E A Young
VP & Supt: Nels Kempaninen
Sec: D D Haley
MINNEWAS MINE, PO Box 118, Virginia, 2 mi E of Virginia, Mesabi Range, surface & undergr, Fe
Frm: A N Heikkila
(See Haley-Young Mng Co, Minn)

MISSISSIPPI

AMERICAN COLLOID CO
5100 Suffield Court
Skokie, Ill
ABERDEEN MINE, Aberdeen, surface, bentonite
Supt: Edward G Birkholz
ABERDEEN MILL
Cap: 250 tons
WHITE SPRINGS MINE
White Springs (PO at Aberdeen) surface, bentonite
Supt: Edward G Birkholz
(See Ill, SD, Wyo)

FILTROL CORP
Smithville
MINE, open pit, Smith Co, bentonite
Supt: Charles Cantrell

HOWELL-SOUTHERN, INC
Ripley
MINE, open pit absorbent (clay)

INTERNATIONAL MINERALS & CHEMICAL CORP
Smithville (PO at Amory)
Mgr: C M Clay
Supt: J Flowers
SOUTHERN BENTONITE MINE, open pit
(See Ariz, Fla, Ill, Maine, N Mex, NC SD, Tenn, Va Wyo)

KENTUCKY-TENNESSEE CLAY CO
Mayfield
MINE, Crenshaw, ball clay
Supt Gardner Wilks

MAGNET COVE BARIUM CORP
Kosciusko
MINE, open pit
(See Fla, Mo, Nev, Tex, Wyo)

WYANDOTTE CHEMICAL CORP
Blue Mountain
MINE, open pit, absorbent clay
Gen Mgr: E G Andrews
Gen Supt: V V Thompson
(See Calif, Mich)

MISSOURI

AMERICAN ZINC, LEAD & SMELTING CO
1515 Paul Brown Bldg, St Louis
Pres: H I Young
VP: R A Young
VP & Treas: W J Matthews, Jr
VP & Controller: C V Burns
Sec: R C Perkins
Purch Agt: E K Minear
Mgr Mng Opers: R E Calhoun
Dir Mllg & Min Benefic: R Ammon
(See Ariz, Ill, Ohio, Okla, Tenn, Tex Utah, Wash, Wisc & American Peru Mng Co, N Mex)

APEX MNG CO
Box 318, Mineral Point
MINES, Washington Co, open pit, Ba

BROWN ORE MNG CO
Greenville
Mgr: Lucean E Finch

MINE, Fe
No Prod

CARROLL, EE & EH
MINES, Ozark Co, open pit, Fe

COMMERCE MNG CO
509 Olive St, St Louis 1
Pres & Treas: G H Fox
VP, J W Meyer
Sec: D H Fox
(See Colo)

DE SOTA MNG CO
MINES, Washington Co, open pit, Ba

FOUR MNG CO
MINE, Howell County, open pit, Fe

GENERAL BARITE CO
DeSoto
MINES, Washington Co, open pit, Ba

H & P MNG COMPANY
605 Valley Rd, Potosi
MINES, Washington Co, open pit, Ba

HOLLEY MNG CO
Potosi
MINE, Washington Co, open pit, Ba

HORNSEY BROS CO
Potosi
Pres: F Hornsey
MINE, Washington Co, open pit, Ba

HOWARD CONSTRUCTION CO
West Plains
MINE, Howell Co, open pit, Fe

IRON COUNTY MNG CO
Arcadia
Mgr: E A Knupp
MINE, Mn
No Prod

KOSHKONONG MNG CO
MINE, Howell Co, open pit, Fe

MAGNET COVE BARIUM CORP
Potosi
MINE, Potosi, open pit, barium
Plant Mgr: George L Carter
Asst Plant Mgr: Floyd H Carter
#1 WASHING PLANT, at mine
Supt: B J DeClue
#4 WASHING PLANT, at mine
Supt: A E Williams
250-TON MILL, at mine
Supt: Russell Degonia
(See Fla, Miss, Nev, Tex, Wyo)

MERAMEC MNG CO
Box 312, Sullivan
Res Mgr: E L Bilheimer
Asst Res Mgr: R G Peets
Geol: J A Emery
Mech Eng: J R Long
MINE, Sullivan, undergr, Fe
Mine Supt: D W Bent
Under devel-will produce iron pellets when plant is complete

MIDWEST MNG CO
Box 87, Potosi
MINE, Washington Co, open pit, Ba

MIDWEST ORE CO
Iron Mountain
IRON MOUNTAIN MINE, undergr, iron ore
Gen Supt: R P Matson
Purch Agt: A W Janke
Geol: John Murphy
Mine Frm: Byron Miller
Mine Eng: R Pilliard
Master Mech: Henry Gratton
Chief Elec: Vic Callisto
3,000-TON FLOT-GRAV MILL
Mill Supt: Lloyd Erpenbach
Mill Frm: Leo Williams
Luther Williams
Assay: R B Key
(See M A Hanna Co & Midwest Ore Co, Minn)

WADE MILLER MNG CO
Koshkonong
MINE Oregon Co, open pit, Fe

MILWHITE MUD SALES CO
3920 Essex Lane, Houston 27, Texas
Pres: George Conner
Exec VP: H R Wells
Gen Supt, Prod & Properties: R A Woolford
MISSOURI PRODUCTION, HOWELL, PALMER, SUN & WHALEY SCOTT MINES, Washington Co open pit, barite
Gen Supt: Owen Whaley
Mine Eng: William Devitt
MILL, Mineral Point, dry grinding
(See La)

MINE LA MOTTE CORP
250 Park Ave New York 17, New York
MINE LA MOTTE, undergr, surface, Pb, Bonne Terre
Div Mgr: E A Jones
No Prod
2,000-TON FLOT-GRAV MILL, Fredericktown

MINERVA OIL CO
320 N 4th St, St Louis 2
Pres-Treas: Jos Desloge
VP: Jos Desloge, Jr
Gill Montgomery
Bernard F Desloge
Sec: Berkley Jones
(See Ill)

MONSANTO CHEMICAL CO
800 N Lindbergh Blvd
St Louis 66
Pres: Chas H Sommer, Jr
VP: J L Christian,
C A Hochwalt,
J L Gillis
W W Schneider
F N Williams
INORGANIC CHEM DIV
Gen Mgr: E J Bock
Exec Admin: H F Weaver, J M Depp
Dir of Mng: G Donald Emigh
Dir of Dev: J J Burbage
Dir of Research: R K Flitcraft
Dir of Eng: F P LaBelle
Dir of Mfg: H O Tittel
R B Nason
Dir of Mrktng: J E Crawford
Dir of Pers: K B Bernhardt
Dir of Raw Mat & Traffic: E G Thoenes
(See Idaho, Tenn)

NATIONAL LEAD CO, BAROID DIVISION
Cadet
BOTTOM DIGGINS MINE, barite
DRY GRIND MILL
Supt: E L H Sackett
(See Ark, Calif, Colo, Kans, La, Mont, Nev, NY, Tenn, Tex, Wyo)

NATIONAL LEAD CO, ST LOUIS SMELTING & REFINING DIVISION
Box 351, Fredericktown
Gen Mgr: O D Niedermeyer
Mgr: Harold A Krueger
REFINERY, Fredericktown, Pb, Cu, Ni, Co
Mgr: W R McCormick
Supt: G E Peters
(See Ark, Calif, Colo, La, Mont, Nev, NY, Tenn, Tex, Wyo)

NORTHSTAR MNG CO
Gravois Mills
MINE, barite
No Prod

PLATEAU IRON ORE CORP
711 Hulman Bldg
Evansville 8, Ind
Pres: Ira Van Tuyl
VP: A S McGregor
Sec: E C Robinson
Treas & Purch Agt: Roy Pledger

CALHOON MINE, Howell County 3 mi SW of West Plains, open pit, Fe
Gen Mgr & Supt: Jack Rogers
Under devel
Prod: 120 tons
400-TON MILL, HMS, 1 mi N of West Plains on Hwy 63
Mill Supt: Jack Rogers
Asst Mill Supt: E C Strickland
SAPP & SANDERS MINES, Oregon County near Koshkonong, open pit, Fe
Gen Supt Jack Rogers
No Prod
(See Ind)

C & W POLITTE MNG COMPANY
Cadet
MINE, Washington Co, open pit barite

POTTER & SIMS
Box 229, Joplin
Part: George W Potter
D S Sims
Gen Supt: Leonard Parker
Mine Frm: George T Brown
SUCKER FLAT MINE Webb City
WESTSIDE MINE, 1/2 mi S of Alba, open pit, Pb, Zn
2,500-TON FLOT-GRAV MILL, Webb City
No Prod
DEWEY S SIMS RITZ MINE, undergr

RIPLEY CO MNG CO
332 Vine St, Poplar Bluff
MINE, Ripley Co, open pit, Fe

ST JOSEPH LEAD CO
250 Park Avenue, New York 17, New York
SOUTHEAST MISSOURI MNG & MLG DIVISION, Box 32, Bonne Terre, undergr, Pb, Zn, Cu
Div Mgr: Elmer A Jones
Asst Div Mgr: L W Casteel
Ch Geol: Frank Snyder
Gen Mech Supt: B L Beal, Jr
INDIAN CREEK MINE & MILL
Supt: John Kiser
VIBURNUM MINE & MILL, Crawford, Iron & Washington County, undergr, Pb, Zn, Cu
Supt: K R Baker
Gen Mill Supt: T J Clifford
Gen Mine Supt: C B Davis
Asst Gen Mine Supts: P N Ferguson, B T Wykoff
Prod: 23,000 tons
5 FLOT MILLS
Mill Supts: H A Hoffman, E J Krokroskia, L Pratte, T R Morton, M Dunlap
Cap: 23,000 tons
BLAST FURNACE, Herculaneum
Div Mgr: John W Sherman
Cap: 100,000 tons lead yrly
(See NY, Pa)

SCHROEDER MINING CO
Box 73, Koshkonong
Pres: P E Schroeder
VP: J R Ritchay
400-TON HEAVY MEDIA MILL, Koshkonong
Mill Supt: J B Baker
Assayer: C F Brooks
(See Minn)

SHOOK & FLETCHER SUPPLY CO
West Plains
KINGSBURY MINE, Howell County, MELTON MINE, Shannon County, open pit, Fe
Gen Mgr: E H Craddock
Mine Supt: Robert Wilson
(See Ala)

TASKEE MNG CO
332 Vine St, Poplar Bluff
MINE, Wayne Co, open pit, Fe

TERRACE MNG CO
Box 128, Potosi
Pres & Treas: F W Floyd
VP, G B Groves
Sec: Robert D Evans
MINES, open pit, barite
Mine Frm: H D Henry
50-TON GRAV MILL, 7 mi N of Potosi, barite
Mill Frm: H D Henry

WAYNE CO MNG CO
332 Vine St, Poplar Bluff
MINE, Wayne Co, open pit, Fe

WOOD, A W
Valle Mines
MINE, Jefferson Co open pit, Ba

MONTANA

ABBOTT, GRANVILLE
Lewistown
BLACK BULL MINE, Lewistown
Fergus Co, undergr, open pit, Au, Ag, Cu, Pb, Zn
Prod: 10 tons

ALLEN, LLOYD R
LAMON, WILLIAM
Huson
NINE MILE MINE, Missoula County, Au, Ag, Cu, Pb, Zn

AMAZON MNG CO
Box 372, Coeur d'Alene, Idaho
Pres A E Lunden
Sec-Treas Geo M Servick
MINE, near Heron, Au, Ag, Cu
Mont Agt. Jos Brooks, Noxon
Under devel

AMERICAN CHROME CO
1 Montgomery St
San Francisco 4, Calif
Pres: Willis A Swan
VP & Gen Mgr: John Bley
Sec: George M Spradling
Treas: Wm M Groody
Purch Agt: Don W Graves
MOUAT MINE, Nye, undergr, ferrochrome, chrom conc
Gen Mgr: John Bley
Geol: James E Adler
Mech Eng: Guy P Morris
Met: D L Harris
Elec Eng: Beach Miller
Mine Supt: Paul M Price
Mine Frm: Ray Miller
Mine Eng: Henry W Schulze
Prod: 1,000 tons
1,000-TON GRAV MILL, Nye
Mill Frm: Earl Dupaix
ELECTROLYTIC SMELTER, Nye
Supt: M E Hertel
(See Calif)

AMERICAN SMELTING & REFINING CO
JACK WAITE MINE, Sanders County, Pb, Zn
Supt: C H Blackwell
EAST HELENA PLANT, East Helena, custom lead smelter
Mgr: S M Lane
Supt: K D Loughridge
(See Ariz, Calif, Colo, Idaho, Ill, Md, Nebr, NJ, N Mex, NY, Tex, Utah, Wash)

ANACONDA ALUMINUM CO
Columbia Falls
REDUCTION PLANT, Columbia Falls
Prod: 60,000 tons
Asst Gen Supt: E O Woster
(See Ky)

THE ANACONDA CO
Butte
WESTERN OPERATIONS HEADQUARTERS
VP, Western Oper: E I Renouard
Asst VP: E D Tierney
Western Gen Counsel: W M Kirkpatrick
Asst Sec-Treas: W J Fogarty
Adm Asst: R E Sheridan
Western Gen Purch Agt: T K Davis
Ch Mech & Elec Eng: C J Lundberg
Chmn-Bur of Safety: H A Wendel
Ch Vent & Ind Hygiene Eng: J W Warren
Ch Geol - Mont Oper E P Shea
Dist Traffic Mgr: W L Kennedy
Salvage & Surplus Eqpt Mgr: W B Renouard
Dir, Mng Research: R M Steward
Pers Mgr: J C Kearns
BUTTE MINES OPERATION
Butte
Mgr of Mines: M K Hannifan
Gen Supt of Mines: E O Bonner
Asst Supt of Mines: V D O'Leary, G W Parker, W R C Russert
Ch Clerk, Mines Off: G P Murphy
Pers Mgr D P Griffin
Ch Safety Eng: M J Harkins
Plant Eng: G H Lilly
Vent & Ind Hygiene Eng: F J Laird
Ch Geol: C C Goddard, Jr
Ch Mng Eng: R D Piper
Ch Assay W C Gallagher, Jr
Planning Eng: R P Corbett
BERKELEY PIT Butte Dist open pit, Cu
Supt: E E Norris
Frm: J E Murphy
MOUNTAIN CON MINE, Butte Dist, undergr, Cu
Supt: J Suttie
Frm: M LaTourrette
KELLEY MINE, Greater Butte proj, Butte Dist Cu
Supt: J Kilroy
Frm: W J Creber
BADGER-ELM ORLU MINE, undergr, Cu
Supt: R Powell
Frm: R C Garrett
HIGH ORE MINE, Butte dist, undergr, Cu
Frm: J J Canavan
STEWARD MINE, Butte dist, undergr Cu
Frm: R Cox
ST LAWRENCE FIRE FILL
Frm: J K Ballard
PRECIPITATION PLANT
Frm: J P Ryan
ANACONDA REDUCTION DEPT, Anaconda
Mgr: W A Emanuel
Gen Supt: F H Day
Asst Gen Supt: J H Moore
Supt-Conc: F A Roeder
Supt-Smelting: E S Kramlick
Proj & Dev Eng: C H Holstrom
Asst Supt-Smelting-Reverb: J T O'Donnell
Asst Supt-Smelting-Conv & Casting: J S McDonald
Asst Supt-Smelting-Dust Treating: J J Dougherty
Supt-Zinc Plant: F A Salomonson
Asst Supt, Smelting-Roaster: H D Cross
Supt, Phos & Acid Plant: K F Ruckwardt
Supt, Mang Plant: E O Strommen
Dir, Met Research: F L Holderreed
Asst Dir, Met Research: R E Sullivan, W H Foard, T G Fulmor,
Met: J H McCrea
Ch Chem: E N Boyce
Plant Eng: R P McCarren
Const Supt: M A Stokke
Ch Draftsman: E P Dimock
Ind Hygiene Eng: H F Morris
Safety Eng: W Williams
Supt, Tailings Disposal: J A Grant
Supt-Tram: I C Gnose
Supt-Surface: J F Sladich
Supt-Fire & Watch: J J Dillon
Supt-Repair Foundry: H M Hansen
Pers Dir: D M MacDonald
Ch Clerk: W D Martin
COPPER CONCENTRATOR 38,000 tons

ZINC CONCENTRATOR
4,000 tons
COPPER SMELTER
150,000 tons yrly
ELECTROLYTIC ZINC PLANT
86,400 tons yrly
SULPHURIC ACID
600 tons 60° Baume acid
TRIPLE SUPERPHOSPHATE
100,000 tons yrly
ARSENIC PLANT
1,000 tons white arsenic monthly
GREAT FALLS REDUCTION DEPT, Great Falls
Mgr: F S Weimer
Gen Supt: L J Ingvalson
Asst Gen Supt: L C Powell
Supt-Copper Plant: G M Cadwell
Asst Supt: E J Duggan
Supt-Zinc Plant: R H Balhiser
Asst Supt: C F DeArmond
Ch Clerk-Acctg: W P Sneddon
Pers Dir: E G Cox
Plant Eng: C R Hill
Met: G T Weaver
ELECTROLYTIC & FURNACE COPPER REFINERIES
144,000 & 138,000 tons yrly
EAST HELENA SLAG TREATING PLANT, East Helena
Supt: R L Thompson
Asst Supt: A B Kane
(See Calif, Idaho, Nev, N Mex, NY)

BALTIMORE SYNDICATE LTD
Box 755, Heppner, Ore
Gen Part: C M Wagner, MD
THE BALTIMORE MINE, Boulder, Jefferson County, undergr, Pb, Zn, Cu
Gen Mgr: Louis Peura
Geol: David E Laughgran
Under devel

BANKS, HOWARD C
Box 514, Deer Lodge
HIDDEN HAND MINE, Powell Co, undergr, Au, Ag, Pb, Zn

BLACK, ELDON H
Cardwell
MAMMOTH MINE, Madison County, Au, Ag, Cu, Pb, Zn

BLACK & WHITE MNG CO
2316 Cloverdale Dr
Missoula
Pres: Roger F Little
VP: George T Croonenberghs
Sec: Margaret W Little
BROOKLYN & D-G MINES, Maxville, undergr, Ag, Pb, Zn, Cu
Gen Mgr: E A Scholz
Gen Supt: R B Landis
Under devel & producing now
250-TON FLOT MILL, at mine
(Property leased to AMEX-American Exploration Co, 2300 Russ Bldg, San Francisco, Calif)

BOWES, ED
360 E Granite St, Butte
MONTANA MINE, Jefferson County, Au, Ag, Cu, Pb, Zn

BROOKS, LYMAN H, JR
Cooke City
REPUBLIC MINE, Park Co, Au, Ag, Cu, Pb, Zn

BROWN, CLAUDE H
Box 102, Dillon
SNOW WHITE TALC MINE, Stone Creek mng dist, on Spring Creek, Madison County, undergr, talc
No Prod
RUBY VIEW TALC MINE, Stone Creek mng dist, Madison County, open pit, talc
No Prod
BROWN NO IX MINE, Divide mng dist, Silver Bow County, undergr & open pit, CaF_2 Mg, dolomite
No Prod

ELLISTON LIME CO
303 N Ewing St,
Box 803, Helena
Pres: Gertrude L Kuehn
Sec & Treas: Margaret H Kuehn
Gen Mgr: A L Gallagher
MINE, undergr, open pit, high calcium quick lime & hydrated sized lime-stone
Prod: 200 tons
Mine Supt: A L Gallagher
MILL, at mine
Mill Supt: A L Gallagher

ERICKSON, MYRON E
LOMBARDI, CLEM
Dillon
SILVER KING MINE, Beaverhead County, Au, Ag, Pb, Cu, Zn

F & S MINING CO
1300 Chicago, Butte
Pres: L M Sheridan
RAMSHORN CLAIMS, Sheridan Dist, Madison County, Fe
Under devel

FAITH MNG CO
Box 1881, Helena
Pres: T D Tobin
VP: G M Vaughn-Rhys
Sec: Blanche Mares
LIBERTY MINE, Monarch, Barker mng dist, undergr, Ag, Pb, Zn, Au
Under devel

FLEMMING, G M
PO Box 434, Dillon
MERLIN MINE, 12 mi S of Ennis, Madison County mica

GARRETT MNG & MLG CO
PO Box 324, Anaconda
Own: Eugene Garrett
MICKEY MINE, Red Lion mng dist, undergr, Au, Bi, Ag
18-TON GRAV-CONC-AMAL MILL, 1/4 mi from mine
Under devel

GILDERSLEEVE MINES
PO Box 565, Superior
Own: Geo M Gildersleeve
BONANZA GROUP MINE, undergr, placer
Under devel

GIULIO, HAROLD
Boulder
SILVER HILL MINE, Jefferson County, Au, Ag, Cu, Pb, Zn

GLINESKI, F L
HALLBERG, PAT
311 N Rodney St,
Helena
ROYAL MINE, Powell County, Au, Ag, Cu, Pb, Zn

GOLDEN, B L
Sheridan
BILLY BENNIT MINE, Madison County, Au, Ag, Cu, Pb, Zn

GOLDEN ANCHOR MINING & MILLING CO, INC
1429 Old Natl Bank Bldg
Spokane, Washington
GOLDEN ANCHOR MINE, Powell County, Au, Ag, Cu, Pb, Zn

HAMILTON MINES, INC
Lennep, Montana
Pres: P V Grande
VP: C Hereim
Sec-Treas: G Voldseth
Gen Mgr: G Voldseth
YELLOWSTONE MINE, undergr, open pit, Pb, Ag
Mine Supt: Henry Twedt
Mine Eng: Robert L Lund
Prod: 20 tons

HANNIFIN, PHIL
515 S Idaho St, Butte
POSER MINE, Silver Bow County, Au, Ag, Cu, Pb, Zn

HALF MOON MNG CO, INC
207 Hedden Bldg,
Billings
Pres: George Guay
VP, William G Mouat
Sec-Treas: Harvey Guary
HALF MOON MINE, Big Timber Creek, Sweet Grass county, undergr, Pb, Ag, Au
Gen Mgrs: George Guay, Wm G Mouat
No Prod

HAND MINE
Argenta
Own & Oper: John Hand, Dillon
MAULDEN MINE, Argenta dist, Ag, Au, Pb, Cu, Zn
Mine Supt: Bill Hand, Dillon
IRON MT CLAIMS, adjoining mine
POLARIS MINE, Polaris

HERA EXPLORATION CO
Box 4, Clinton
Pres: W H Pillatos
VP: M G Chamberlain
Sec-Treas: George Ames
HIDDEN TREASURE MINE, Clinton, undergr, Cu, Ag, Au, Pb
Gen Mgr: W H Pillatos
Gen Supt: M L Bohn
Geol: Dave Hintzman
Under devel
Mine Frm: Chas Bissell
Mine Eng: Billy Hicks
50-TON FLOT MILL, Clinton
Mill Supt: Dewey Fisher
Assayer: Dave Hintzman
(See Wash)

HERR, F E
Box 368, Dillon
CHARTER OAK MINE, Blue Wing dist, Beaverhead County, Ag, Pb
Under devel

HO & HOCO, INC
PO Box "O" White Sulphur Springs
Pres & Purch Agt: C R Oliphant
VP: Ed C Hughes
Sec-Treas: Albertina Gratz
CUMBERLAND MINE, Meagher County, Castle Mt dist, undergr, Pb, Ag
Under devel
Prod: 15 tons

HOPKINS, JOHN F.
401 N Montana, Helena
NEGROS MINE, Elliston, undergr, Pb, Ag, Au
No Prod

HORSE CREEK DEVELOPMENT GROUP
1327 W Granite St, Butte
Agent: Koehler Stout
SILVER BULLION MINE, undergr, Ag, Pb
Under devel

HUGHES, ED
1301 Porphyry St, Butte
TUXEDO MINE, Silver Bow county, undergr, Au, Ag

HUGHESVILLE LUMBER & MNG CO, INC
PO Box 33, Monarch
BLOCK P MINE GROUP, Judith Basin County, Au, Ag, Cu, Pb, Zn

HUGHS, FOX & WARD
c/o Al Ward, Armstead
SWEENEY MINE, Beaverhead County, Au, Ag, Cu, Pb, Zn

IDEAL CEMENT CO
601 Denver National Bldg
Denver 2, Colo
HANOVER MINE, Fergus Co, undergr, gypsum

ISAAK, R
WESTON, E W JR
Rimini Route, Helena
PEARL MINE, Lewis and Clark County, Au, Ag, Cu, Pb, Zn

JENSEN, RAY
Box 246, Fairfield
TRANSIT MINE, Lewis and Clark County, Au, Ag, Cu, Pb, Zn

JANUARY MINE, INC
Winston
JANUARY MINE, Broadwater County, Au, Ag, Cu, Pb, Zn

KLONDYKE GOLD MINES, INC
c/o Wade V Lewis, Geol
Boulder
KLONDYKE MINE, Elkhorn dist, Jefferson County, Au, Cu

KNOF, VERN C
Canyon Creek
STEMPLE GOLD MINE, Lewis and Clark County, Au, Ag, Cu, Pb, Zn

LAHEY LEASING CO
506 W Aluminum, Butte
ALTA MINE, Corbin-Wickes dist, Jefferson county, Au, Ag, Pb, Zn

LARRIGON MINING CO
c/o C W Berggeren,
404 N 2nd St, Hamilton
LARRIGON MINE, Hughes Creek dist, Ravalli county, Au

LARSEN, W O
Twin Bridges
SHORT SHIFT MINE, Jack Rabbit dist, Madison Co, Au, Ag
Prod: 30 tons

LEDEBUR, ED
SHAFER, GEORGE
Argenta
M & M MINE, Beaverhead county, Au, Ag, Cu, Pb, Zn

LEE IRELAN MINING CO
820 6th Ave, Helena
WOODROW WILSON MINE, Lewis and Clark County, Au, Ag, Cu, Pb, Zn

LEHMAN, WALTER
Box 780, Lewiston
SIR WALTER SCOTT MINE, 70 mi W of Lewiston, undergr, Ag, Pb, Cu, Zn, Au
Under devel
AMERICA MINE, 25 mi NE of Lewiston, undergr, Pb, Ag, Au, fluorine
Under devel
CHRISTOPHER COLUMBUS MINE, Undergr, Au, Ag, Pb, Cu
No Prod
GOLD BUG MINE, undergr, Au, Ag, Cu
(Leased)
Under devel

LENLING, LAWRENCE
Box 74, Lewiston
SHEEP MOUNTAIN MINE, undergr, Au, Ag, Pb, Cu, Zn
Under devel
MILL, Helena

LEXINGTON SILVER-LEAD MINES, INC
621 Columbia Bldg,
Spokane 4, Wash
Pres: J A Allen
Sec: F A Engard
LEXINGTON & BIG SEVEN MINES, Nethart, undergr, Ag, Pb, Au, Zn
Gen Mgr: J A Allen
Under devel & Producing
FLOT MILL, at mine
Prod: 125 tons

LINDBOM, WAINO W
1545 1/2 7th Ave, West,
Kalispell
FLATHEAD MINE, undergr and open pit, Au, Ag
(Leasing from Anaconda Co, Hog Heavens Mining)

LITTLE ROCKIES MNG & DEVELOPMENT CO
Landusky
Pres: Cecil Flinders
VP: Edward F Wieglenda
Purch Agt: Marion Heller

LITTLE BEN MINE, Landus, Au, Ag
Gen S
Supt: E E Wieglenda
Geol: Barney Eglit
No Prod
100-TON FLOT & CYAN MILL, Landusky, undergr,
Gen Mgr: Marion Heller

LIVELY MINING CO
Box 96, Melrose
Pres: R B Lively
HECLA MINE, undergr, Pb, Zn, Au, Ag
Gen Mgr: Burr L Lively
Under devel
Prod: 25 tons
50-TON GRAV MILL, Trapper City
No Prod

LUKE, RUSSELL B
1021 E Front St, Butte
JACK PINE PHOSPHATE MINE, 9 mi NE of Elliston, undergr,
Under devel
LUKE'S SILICA QUARRY, 6 mi W of Anaconda, open pit
(leased to Bunker Hill Co)

LYON CONSTRUCTION CO
Clinton
LYON PLACER, on Maywood Gulch, Granite County, Au

M & H MINING CO INC
Box 251, Boulder
Pres: Ray Millis
VP: Loyal A Clark
Sec: Rudy C Hartmann
Treas: Dr F N Petersen
CRYSTAL MINE, Basin, undergr, Pb, Zn, Cu, Ag, Au
Gen Mgr: R C Hartmann
Asst Gen Mgr: Ray Millis
Gen Supt: Chester Bullock
Mine Supt: Joe LaComb
Prod: 35-50 tons

MAZOLI & MADDEN
Basin
MANTLE MINE, Jefferson County, Au, Ag, Cu, Pb, Zn

MARTIN BROTHERS MINING CO
Box 514, Hot Springs
Pres: O F Martin
VP: Irene Martin
Sec-Treas: R E Martin
Purch Agt: O A Martin
MINE, undergr, open pit
Gen Mgr: O F Martin
Asst Gen Mgr: R E Martin
Gen Supt: O F Martin
Mech Eng: R E Martin
Under devel

MEDVIT, JOHN
732 North St, Walkerville
GREGORY MINE, Silver Bow County, Au, Ag, Cu, Pb, Zn

MILLER PLACERS
Libby
Own: Oscar V Miller
MINE, Libby, placer
No Prod

MINERAL KING MNG CO
Dixon Bldg, Missoula
Pres: C F Buis
VP: Marie E Buis
Sec-Treas: M Swanson
MINE, Saltese, undergr, Pb, Ag
Gen Mgr: C F Buis
Asst Gen Mgr: F Mass
Gen Supt: Dan Mass
Geol: Jay Norling
Mine Supt: F Mass
Asst Mine Supt: Dan Mass
Under devel
TARBOX & MEADOW MOUNTAIN MINE, undergr, Au, Ag, Pb, Cu

MINERALS ENGINEERING CO
801 Fourth Ave,
Grand Junction, Colo
Pres: R G Sullivan
VP: Robert W Price
Sec: Glen P Wilson
Treas: Richard Warren

Purch Agt: Edson Foster
CALVERT CREEK MINE, Beaverhead County, open pit, WO_3
Gen Mgr: R W Price
Asst Gen Mgr & Mine Supt: E M Craig
Asst Mine Supt: M F Riebhoff
700-TON FLOT MILL, Glen
Mill Supt: E M Craig
Asst Mill Supt. Boyd Koenig
(See Colo, Utah)

C E MITCHELL & SONS
308 4th Avenue, South
Great Falls
L & M PLACER, Finn dist, Powell County, Au

MONTANA CLIMAX CORP
Box 421, Philipsburg
Pres: James R Hunter
Own: James A Poore, Jr, Butte
CLIMAX MINE, Philipsburg, undergr, Mn

MONTANA GOLD & SILVER CO
Box 295, Helena
Pres: William Hall
SILVER CRESCENT MINE, Rimini dist, Lewis and Clark County, Au, Ag, Pb, Zn

MONTANA PHOSPHATE PROD
Garrison
Pres: W G Jewitt
VP: F E Burnet
Sec: E G Randall
GRAVELEY, GIMLET & LUKE MINES, 9 mi NW of Avon,
BROCK MINE, 8 mi NW of Garrison, undergr, open pit, phosphate rock
Gen Supt: F E Burnet
Mines Supt: C W Noon
Geol: L V Bell
Mines Acct: N Aked
Mines Eng: A M Scott
Mines Frm: C R McDonald
L Brander, L Koon
Under devel
Prod: 1500 tons

MULTIFORM MNG & EXPLORATION CO
Box 206, Radersburg
Pres: T E Carpentier
GOLD BUG & MARY ROSE MINES, undergr, Au, Ag
Under devel

NANCY LEE MINES INC
410 Main St, Kellogg, Idaho
NANCY LEE GROUP, Superior, undergr, Ag, Cu, Pb, Zn
KING & QUEEN MINES, Ag, Cu, Pb, Zn
125-TON FLOT MILL

NAT'L LEAD CO BAROID DIVISION
Box 1675, Houston, Tex
COLOMA AND ELK CREEK MINES, bentonite pit, Carter County
GREENOUGH PLANT, jigging, grinding
Mine & Mill Supt: J P Murphy
(See Ark, Calif, Colo, Kans, La, Mont, Mo, NY, Tenn, Tex, Wyo)

NATIONAL URAN CORP
510 Bank St, Wallace, Ida
CLAIMS, LUCKY JOE MINE, Ravalli Co, U_3O_8
No Prod
(See Idaho)

NONPAREIL MNG CO
801 Milwaukee Ave, Deer Lodge
Pres: E M Bielenberg
Sec-Treas: Claude H Bielenberg
NONPAREIL MINE, 6 mi E of Maxville, undergr, open pit, Pb, Ag, Au
No Prod

NORTH AMERICAN UTILITIES CORP
Suite 800, 1420 Sherbrooke St, West, Montreal 25, Quebec, Canada
CARTER CREEK PROSPECT, Beaverhead County, Fe
Under devel

NORTH WESTERN MNG & EXPL CORP
12822 3rd Avenue, South, Seattle 88, Washington
Pres: Albert L Workman
VP: Lyman Battey
Sec-Treas: James E Williams
THIRD TERM MINE, Powell County, undergr, Pb, Cu, Au, Ag, Zn
Gen Supt: James E Williams
Under devel
25-TON GRAV MILL, at mine
(See Utah, Wash)

NORTHERN MILLING CO
PO Box 361, Townsend
Pres & Purch Agt: Paul I Raber
VP: Loren J Anderson
Sec: Alfred S Ophus
Treas: Wm H Artz
Mine Supt: Edw F Wieglenda
Geol: Peter H Sweeney
Met: Tan Lee
HAWKEYE MINE, Zortman, undergr, open pit, Au, Ag
No Prod
MARIETTA MINE, 14 mi W of Townsend, undergr, Au, Ag, Pb
No Prod
250-TON FLOT MILL, at Marietta Mine

OBELISK EXPLORATION CO
1327 W Granite, Butte
Pres: J Goodrich
Mgr: J LaComb
MINE, 2 mi E of Basin, Ag, Pb, Zn

PARKS, JACK
Box 59, Lincoln
GOLD DOLLAR MINE, Lewis and Clark County, Au, Ag, Cu, Pb, Zn

PEURA, LOUIS
1124 6th Ave, Helena
BASIN JIB MINE, Jefferson County, Au, Ag, Cu, Pb, Zn

PLANET EXPLOR CORP
PO Box 64, Bozeman
THUMPER MINE, 30 mi S of Bozeman, Gallatin Range, undergr, open pit, Muscovite mica
Gen Mgr: Chas M Hauptman
Mine Frmn: Louie Evans
Prod: 500 lbs
FRAN #243 MINES
(See NY)

PRUETT, BILL
Box 442, Whitehall
COLORADO MINE, Madison Co, undergr, Au, Ag

RALLS & HARRIS BROS
PO Box 114, Radersburg
IRON CROSS MINE, Broadwater County, open pit, Fe
Prod: 45 - 50 tons

RAVEN MINING & TIMBER CO
Box 32, Thompson Falls
Part: Austin Monk
Ralph Provence
RAVEN #1 MINE, Thompson Falls, Sanders County, Cu, Ag, Au
Under devel

RELYEA, GEORGE A
Box 85, Garrison
RELYEA PHOSPHATE MINE, 11 mi N of Garrison, undergr, phosphate rock
Mine Frm: Venn Gilman
Prod: 235 short dry tons
KLINESCHMIDT MINE, Winston, undergr, Pb, Zn
No Prod

RIDER, GEORGE I
Townsend
IRON MASK GROUP, Broadwater County, Au, Ag, Cu, Pb, Zn

ROGERS, R H
EVANS, J G
Box 125, Virginia City
SILVER BELL MINE, Madison County, Au, Ag, Cu, Pb, Zn

RUBY VALLEY DEVEL CO, INC
6216 S Montgomery St, Tacoma 9, Washington
Pres: Harry K Albrecht
Sec: Fred E DePuy, 5413 112th St SW, Tacoma, Wash
RED PINE MINE, Sheridan, undergr, Au, Ag
Under devel
(See Wash)

RUSSKEN MNG CO
83 East Park, Butte
Pres & Mng Eng: Kenneth M Judd
VP & Gen Mgr: Russell B Luke
Sec-Treas: Harriet Judd
LUKE JUDD SILICA QUARRY, 5 mi W of Anaconda, open pit, silica
Prod: 30,000-40,000 tons yrly

ST PAUL LEAD CO
PO Box 750, Kellogg, Idaho
SNOWSHOE & ST PAUL MINES, Libby, Lincoln County, Pb, Ag, Au, Zn, Cu
Prod: 100 tons
Mine Supt: A L Osborn
100-TON FLOT MILL, Libby
Mill Supt: O W Herlin
(See Idaho)

SAWYER PETROLEUM CO
650 S Grand Ave, Los Angeles 17, Calif
Pres: E W Sawyer, Jr
VP: J A Sawyer, R D Sawyer
Sec: C W Faucett
LAST CHANCE MINE, Grant, open pit, Th and rare earths
Under devel
PILOT MILL, Salt Lake City, Utah
(Property assigned to Techmanix Corp of Salt Lake City for development)
(See Ariz)

SCHAFFER, JAMES B
207 W Center St, Dillon
YELLOW BAND MINE, Argenta Dist, Beaverhead County, Au, Ag
Under devel

SCHEITLIN, ED
PO Box 873, Butte
BIG BERTHA MINE, Madison County, Au, Ag, Cu, Pb, Zn
GREAT REPUBLIC MINE, Silver Bow County, Au, Ag, Cu, Pb, Zn

SCHNEIDER, FRED
Winston
LITTLE BONANZA MINE, Broadwater County, Au, Ag, Cu, Pb, Zn

SHUTE, A E & R J
Jefferson City
SAILOR'S DREAM MINE Jefferson County, Au, Ag, Cu, Pb, Zn

SIERRA TALC CO
1606 Huntington Dr, So Pasadena, Calif
YELLOWSTONE MINE, Madison Co, talc
Supt: E W Stevens

SILVER REEF MNG CO
c/o Wm C Montgomery
1818 West Park St, Anaconda
SILVER REEF MINE, Deer Lodge County, Au, Ag, Cu, Pb, Zn

J R SIMPLOT CO MINERALS & CHEM DIVISION
Box 912, Pocatello, Idaho
Pres: J R Simplot
VP & Gen Mgr: W Grant Kilbourne
CENTENNIAL MINE, Monida, 38 mi E of Monida, open pit, phosphate
Gen Mgr: O E Pothier
Mine Supt: Dave Aro
Mine Eng: Leonard Garrand
No Prod
(See Idaho, Nev, Wyo)

SISKON CORP
422 Gazette Bldg, Reno, Nev
Pres: H B Chessher, Sr
VP: E J Schrader
Sec: J E Chessher
Asst Treas: A L Chadek
YOGO SAPPHIRE MINE, Judith Basin County, Montana, undergr, open pit,
Gen Mgr: H B Chessher, Sr
Gen Supt: H B Chessher, Jr
Met: H L Hazen
Mine Supt: M R Biswell
GRAV-JIG MILL, at mine
Mill Supt: M R Biswell
(See Calif, Nev)

SLOAN, E R
520 W Silver St, Butte
SPARKLE MINE, 11 mi SE of Dillon, Beaverhead County, mica

SMITH, LEE
RILEY, RAY E
645 Kentucky, Dillon
CROSS MINE, Beaverhead County, Au, Ag, Cu, Pb, Zn

SPOKANE NATIONAL MINES, INC
414 Fernwell Bldg, Spokane 1, Wash
Pres & Purch Agt: G H Allison
VP: H J Tibbits
Sec: Cline E Tedrow
HENDRICKS MINE, Bannack, undergr & open pit, Au
NEW DEPARTURE MINE, Dillon (joint operation with Sunset Mines, Inc), undergr, open pit, Ag, Au, Pb, Zn, Cu
Gen Mgr: G H Allison
Supt: E H Brooks
Mine Frm: Carl Caracker
Prod: 100 tons
120-TON FLOT-CYANIDE MILL, Bannack
Mill Supt: E H Brooks
Assay: H Hand
REVERB-RETORT-FUMING-REFINING FURNACE, Bannack
(See Idaho, Wash, Sunset Mines, Inc, Idaho, Mont, Wash)

SUNSET MINES, INC (WHOLLY OWNED SUBSID OF SPOKANE NATIONAL MINES INC)
414 Fernwell Bldg, Spokane, Wash
Pres: G H Allison
VP: Cline E Tedrow
Sec-Treas & Purch Agt: H J Tibbits
NEW DEPARTURE MINE (joint operation with Spokane National Mines, Inc), Dillon, 16 mi W of Dillon on Bannack Rd, undergr and open pit, Ag, Au, Pb, Zn, Cu
Gen Mgr: G H Allison
Gen Supt: Earl H Brooks
Prod: 150 tons
150-TON MILL, Bannack
Mill Supt: E H Brooks
(See Idaho, Wash, also Spokane National Mines, Inc, Idaho, Mont, Wash)

SWANSEA MINES, INC
Box 904, Helena
Pres & Gen Mgr: C L Hewitt
Sec: M D Armstrong
SILVER BELL MINE, 40 mi NW of Helena, undergr, Au, Ag, Pb, Cu
No Prod
CARBONATE MINE,
Gen Mgr: C L Hewitt
No Prod
100-TON MILL, 60 mi NW of Helena

SWANSON, MAGNUS
METESH, JOE
Philipsburg
COMANCHE EXTENSION, CUDGIE-TAYLOR & SWEET HOME MINES, Granite County, Au, Ag, Cu, Pb, Zn

TAYLOR-KNAPP CO
Box FF, Philipsburg
Pres: S R Knapp
VP & Gen Mgr: A V Taylor
Sec & V P: Alf C Kremer
Mgr: Donald S Johnson
Ch Eng: Charles P Knabel
MOORLIGHT GROUP, TRUE FISSURE & DURANGO MINE, Philipsburg, undergr, Mn, Ag, Zn, Pb, Au
Mine Supt: Jack B McCoy
Ch Acct: Claude Sorensen
Mine Frm: Geo H Raille
100-TON GRAV-MAG MILL, Philipsburg
Mill Frm: G Knoale
Assay: F S Neal

TILLOTSON, V I & A L
330 Spring St, Route 8
Helena
ACME #1 MINE, Broadwater County, Au, Ag, Cu, Pb, Zn

TREASURE STATE URANIUM CORP
1301 Porphyry St, Butte
MAYWOOD PLACER, Princeton dist, Granite County, Au

TRI STATE MINERALS CO
Box 227, Dillon
Sr Part: W K Skeoch
KEYSTONE, TREASURE & SMITH TALC MINE, Dillon open pit, talc
Div Mgr: D B Tash
Mine Supt: Ernest Nygren
Geol: C F Joy

TROUT MINING CO
233 Broadway, New York 7, NY
Pres: Chas A R Lambly
Sec: R G Burns
Treas: G A Swensumson
TREE TOP & ALGONQUIN MINES, Philipsburg, undergr, and open pit, Ag, Zn, Pb, high grade Mn
Gen Mgr: Chas A McKinley
Geol & Prod Eng: Henry Balletto
Prod: 200 tons
GRANITE MINE, 5 mi E of Philipsburg, undergr, Ag, Zn, Pb, Cu, Au
Under devel
200-TON FLOT-GRAV MILL, Philipsburg
Mill Supt: C A McKinely
Mill Frm: Kenneth Bauer
Cap: 150 tons Pb-Ag-Zn ore and 50 tons Mn ore
(See NY)

UNITED STATES GYPSUM COMPANY
300 W Adams St, Chicago 6, Ill
MINE, Heath, Undergr, gypsum
Works Mgr: W E Seeburger
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mich, Ohio, Okla, N Mex, NY, Tex, Utah, Va)

VICTOR CHEM WORKS
Box 1966, Butte
MAIDEN ROCK MINE, Melrose, undergr, phosphate rock
CANYON CREEK MINE, Melrose, undergr, phosphate
Under devel
Supt FCE & Mng Oper: F B McCoy
Mine Supt: H F Johnson
Asst Mine Supt: R Gale
Mine Frm: E Kuky
Mine Eng: J Seymore
Prod Supt: H F Johnson
(See Ill, Tenn)

WARD & DAWSON
Box 706, Silver Star
LITTLE JOE MINE, Madison County, Au, Ag, Cu, Pb, Zn

YOUNG-MONTANA CORP
2223 1st Ave, Hibbing, Minn
Pres: E A Young
VP: Joseph Lovallo
Sec-Treas: Thomas McCabe
WILLOW CR MINE, Stanford, 18 mi N of Stanford, open pit, Fe

ZIMMERMAN, WILLIAM
Townsend
ERICKSON #1, 2, 3, Broadwater Co, undergr, Au, Ag, Pb

ZONOLITE CO
135 S LaSalle St
Chicago 3, Ill
Pres: J A Kelley
VERMICULITE MTN MINE, Libby, open pit, vermiculite concentrates
Gen Mgr: R A Bleich
Asst Gen Mgr: E D Lovick
Geol: R J Kujawa
Mech Eng: D W Robinson
Met: W Sahinen
Purch Agt: B J Dorrington
Mine Supt: R J Kujawa
Mine Frm: Orville Thorne
3,000-TON GRAV MILL, near Libby
Mill Supt: Harold Flatt
Mill Frm: Walber Baker
(See Ill)

NEBRASKA

AMERICAN SMELTING & REFINING CO, OMAHA SMELTER & REFINERY
Omaha
Mgr: Ray C Skow
Gen Supt: J C Reinhardt
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, NJ, N Mex, NY, Tex, Utah, Wash)

MILLER & FENTRESS MNG CO
PO Box 307, Hemingford
(See Wyo)

SWEETWATER CHEM CO
6660 Military Ave, Omaha
MINE, Carbon Co, Wyo, open pit, sodium sulfate
(See Wyo)

NEVADA

ALA, JOHN F
Montello
DELNO MINE, Elko County, Pb, Zn, Ag

ALPINE DEVEL CO
c/o Chris Mann, Gardnerville
Pres: Chris Mann
Sec-Treas: W E Slater
GNITE MINE, 18 mi S of Yerington, open pit, silica sand, clay
Under devel

ALTAMONT MNG & URANIUM CO
50 E 10th Street, Bountiful, Utah
MINE, Midas via Golconda, undergr, Au, Ag
Gen Supt: Robert H T Dunsmore
Under devel
(See Colo)

AMERICAN CANYON MINES
11 Sandy Circle, Denver 22, Colo
Own: Harry H Herman
AMERICAN CANYON MINE, Rochester Mining dist, 8 mi E of Oreana in American Canyon, undergr, open pit, Hg, As, kaolin
Gen Mgr: Harry H Herman, Jr
Asst Gen Mgr: Peter D Wulfsohn
Under devel
200-TON GRAV MILL, at mine
REFINERY, at mine
Metal output: 800 lbs of Hg

AMERICAN GEM MNG CO
Tonopah
LONE MT TURQUOISE MINE, undergr, turquoise

ANACONDA COMPANY THE YERINGTON MINES
Box 1000, Weed Heights
Gen Mgr: A E Millar
Asst Gen Mgr: H R Burch
Mine Supt: C J Houck
Plant Supt: A J Gould
Gen Mine Frm: D K Gill
Gen Plant Frm: F R Monninger
Ch Clerk: H L Chesarek
Pers Supervr: K W Humphreys
Storekeeper: R K Owen
Master Mech: R E Bentley
Supervr Rep & Maint of Mobile Equip: M G McCallum
Ch Elect: M H Bissett
YERINGTON MINE, 81 mi SE of Reno, surface, Cu
Prod: 12,000 tons
12,000-TON LEACH & PRECIP PLANT
(See Calif, Mont, N Mex, NY)

AQUAFIL CO (DIV OF KOHL ENTERPRISES, INC)
321 State St, Los Altos, California
Pres: Otto Kohl, Sr
VP: Otto Kohl, Jr
AQUAFIL MINE, 35 mi NE of Fernley, diatomite
CHICK BED MINE, 27 mi NE of Fernley, diatomaceous earth
SECTION 20 MINE
100-TON DIATOMITE FLASH DRYING MILL, Fernley
Mill Supt: Lowell Smith

ARD EQUIPMENT CO INC
PO Box 587, Winnemucca
BARTH IRON MINE, Eureka County, open pit, Fe
Under devel

ARGENTITE ACCOUNT
c/o H R Humphrey
Silver Peak
Part: L H Shirley
H R Humphrey, Ruby Shirley, Frances Chiatovich
MOHAWK MINE, Esmeralda County, undergr, Ag
Mine Supt: Rock Comossi
Asst Mine Supt: L H Shirley
Prod: 50 tons
200-TON CYANIDE MILL, Silver Peak
Mill Supt: Fred Harko
Asst Mill Supt: Henry Albright
Assay: Lew Warrington
(Leased to U S Mtg & Minerals Co)

ARGENTUM MNG CO OF NEVADA
Box 134, Mina
Pres: E S Gates, Sr
VP-Treas-Asst Sec: C E Earl
Sec: J A Crowther
Purch Agts: Anthony Bucci, Judd Hancock
NORTHERN BELLE, HOLMES, MT DIABLO, LUCKY HILL MINES, Candelaria, undergr, and open pit, Au, Ag
Gen Mgr: E S Gates, Sr
Asst Gen Mgr: Carl Earl
Gen Supt, Geol & Mine Eng: James Goldworthy
Mech Eng: Clifford W Ripley
Met: E S Gates, Jr
Mine Supt: John Glennon
Prod: 3,000 tons
3,000-TON FLOT-CYANIDE MILL, Columbus Marsh, Esmeralda County
Mill Supt: Roy Williams
Assay: E S Gates, Jr
3,000-TON BULLION SMELTER, Mina
Supt: Anthony Bucci

ATLANTA GOLD & URANIUM COMPANY
Box 248, Pioche
Pres: J E Little
VP & Gen Mgr: C E Collins
Sec-Treas: Wm R Robertshaw
Directors: Roy A Hardy, K L Knutting, J E Little, Wm R Robertshaw, C E Collins
ATLANTA MINE, 51 mi NW of Pioche, Atlanta dist, open pit, Au, Ag, U_3O_8
Consult Eng: Roy A Hardy
No Prod

AUSTIN, W (LESSEE)
Contractors: Birdes and Blair, Luning
IRON GATE & SULLIVAN MINES, Mineral County, open pit, Fe

BASIC INCORPORATED
845 Hanna Bldg, Cleveland 15, Ohio
Pres & Treas: H P Eells, Jr
Sr VP: H C Lee
Sec: W A Melville
BASIC, INC, NEVADA WORKS
P O Box 4, Gabbs
MINE, open pit, magnesite, brucite
Works Mgr: H P Willard
Geol: Conrad Martin
Works Eng: J F Jankovic
Ch Chem: K B Thompson
Purch Agt: R A McDonald, Jr
Mine Supt: A M Dixon
Asst Mine Supt: T M Cahill
Mine Frm: W P Smith
Prod: 1,000 tons
FLOT & HEAVY MEDIA MILL, Gabbs, 2 rotary kilns, 2 Herreshoff furnaces, special products plant
Mill Supt: Robert W Gates
Asst Mill Supt: R E Sutton
(See Ohio)

BEAR CREEK MNG CO
PO Box 466, Goldfield
CUCAMONGA MOLYBDEMUN PROSPECT, Esmeralda County, Mo
Under explor
(See Alaska, NY & Kennecott Copper Corp, Ariz, NY)

BELMONT LEAD, INC
PO Box 66, Ely
Pres: R De Vivo
VP: T Kite
Sec-Treas: Dr Paul Rose
Purch Agt: W de Carbonel
MINE, Hamilton, undergr, Pb, Ag
Gen Mgr, Geol & Supt: W de Carbonel
Prod: 25 tons
100-TON GRAV MILL, Hamilton
Mill Supt: D Cadagan

BLUE DIAMOND CO DIVN OF FLINTKOTE CO
1650 S Alameda St
Los Angeles 54, Calif
BLUE DIAMOND MINE, open pit, gypsum
Works Mgr: H L Waldthausen, Jr
Maint Supt: F Day
Asst Maint Supt: R Dunagan
Safety Eng: M Rundall
Admn Asst: K H Zahn
Mill Frm: H Wells
Board Plant Supt: E Guthknecht
Asst Board Plant Supt: L Crabbe
Loading Supt: S Conner
Qual Control Supt: R H Whitney
Mine Supt: M C Brooks
Asst Mine Supt: J Cain
Prod: 1,500 tons

BRISTOL SILVER MINES CO
PO Box 218, Pioche
Pres: Byron S Hardie
VP & Treas: Hoyt Adair
Sec: C M Christensen
BRISTOL SILVER MINE, Pioche, undergr, Cu, Ag, Zn, Pb
Gen Mgr: Byron S Hardie
Gen Supt: Arthur J Bosch
Prod: 50 tons

CALDWELL & WILSON
(a partnership)
PO Box 455, Battle Mountain
DAHL PLACERS, 17 mi SW of Battle Mountain, Au

CALZONE MINING CO
281 Maryland Parkway, Las Vegas
RUBY J (BLACK MAGIC) MINE, Baker, Calif
(See Calif)

COMBINED METALS REDUCTION CO, NEVADA OPERATIONS
Pioche
Gen Mgr: Paul Gemmill
Asst Mgr: H E Swanson
Gen Mine Supt: R G Lee
CASELTON MINE, 3 mi W of Pioche, undergr, Zn, Pb
Mine Frm: J L Stewart
No Prod
COMET MINE, 20 mi W of Pioche, undergr, Zn, Pb
No Prod
700-TON CASELTON MILL
FLT-HMS, Zn, Pb
No Prod
400-TON PANACALITE MILL crushing & grinding, crude perlite
Mill Supt: C H Likins
(See Utah)

COMPLEX METALS CORP
912 East Essex Dr, Las Vegas
ARGENTENA CONS MINE, Clark County, undergr, Zn, Pb, Ag
ARGENTENA MILL

CONSOL EUREKA MNG
Eureka
Gen Mgr: Sherman B Hinckley
Asst Gen Mgr & Mine Supt: Dean P Thiriot
DIAMOND MINE, 2 mi from Eureka, undergr, Pb, Ag, Au, Prod: 25 - 30 tons
(See Utah)

COONEY & SONS
Lovelock
SOUTHERN PACIFIC MINE, open pit, Fe

CORDERO MNG CO
131 University Ave
Palo Alto, Calif
VP: S H Williston
CORDERO MINE, McDermitt, 12 mi SW of McDermitt, undergr, Hg
Gen Mgr: J Eldon Gilbert
Asst Gen Mgr: Verne P Haas
Gen Supt: Bert Mitchell
Supt: Cliff Altig
(See Alaska, Calif, Idaho)

CROWELL, J IRVING JR
PO Box 96, Beatty
CROWELL DAISY MINE, Nye County, undergr, CaF_2
Prod: 25 tons

DAKIN, FRED H
2811 Hillside Drive
Burlingame, Calif
CERVANTITE MINE, 23 mi E of Lovelock, undergr, Sb
No Prod

DODGE CONSTRUCTION CO
Lovelock
Pres: E J Maupin
VP: Carl Dodge
Sec-Treas: Lee Cooper
IRON HORSE MINE, Lovelock, open pit, Fe
Gen Supt: George Eckman
Met: Keith Meador
Asst Super: Frank Dunn
Prod: 500 tons

THE EAGLE-PICHER CO, THE INSULATION DIV
PO Box 1869, Reno
CLARK PLANT & MINE
22 mi E of Reno, open pit diatomaceous earth
Gen Mgr: John W Kenney, Jr
Asst Gen Mgr: Milton Steinheimer
Mine Supt: Clay Smith
Prod: 150 tons
150-TON MILL, Clark
Mill Supt: Frank Dodick
LOVELOCK PLANT & MINE, Box 366, Lovelock, 25 mi W of Lovelock, open pit, diatomaceous earth
Gen Mgr: John W Kenney, Jr
Asst Gen Mgr: Milton Steinheimer
Mine Supt: Clay Smith
Prod: 120 tons
120-TON MILL, Colado, 6 mi E of Lovelock
Plant Mgr: Ralph W Yocum
Mill Supt: Emmett Spencer
(See Ill, Kans, Ohio, Okla, Wisc)

ERRINGTON-THIEL MNG CO AND THIEL MNG CO
Ruby Valley
Own & Mgr: Oscar W Thiel
BIG MICA MINE, Ruby Valley, 65 mi SW of Wells, undergr and surface, ruby mica, beryl, rare minerals
Under devel
HOLIDAY COPPER MINE, 50 mi S of Wells, undergr, and surface, Cu, Zn, rare minerals
Under devel

ESTABROOK BARITE CO
613 Camp St, Carlin
MINE, open pit, Ba

FIBREBOARD PAPER PRODUCTS CORP
475 Brannan St, San Francisco 19, Calif
Pres: E W Carey
VP: M R Baruh, G W Burgess, J H Grady, J B Fagot, A S Halley, J F Havard, O C Majors, W K Spence
Sec: J S Mitchell
Treas: V H Erickson
Purch Agt: B A Wilson
APEX GYPSUM MINE, PO Box 2035, Henderson, open pit, gypsum
Gen Mgr: W K Spence
Mine Supt: Glen C Taylor
Asst Mine Supt: George R Dakin
MILL, Apex
(See Calif, Colo)

FISK, W M
PO Box 86, Lovelock
IRON MASS GROUP, 29 mi E of Lovelock, Churchill County, Buena Vista dist, open pit, Fe
PHOENIX GROUP, Buena Vista Dist, Pershing County, open pit, Fe

FLINTKOTE CO, THE U S LIME PROD DIV
P O Box 127, Henderson
Gen Mgr, Nev & Ariz: John MacDonald
Gen Supt: W E Ellis
Mech Eng: Walter Taschek
SLOAN MINE, Box A, Sloan, 10 mi SW of Henderson, open pit, dolomite
Mine Frm: John Sanger
Mine Eng: C H Cardwell
Prod: 1,000 tons
1,000-TON ROTARY KILN, Henderson
Plant Mgr: Walter Taschek
Ch Chem: Dan Walker
APEX PLANT, Box 3598, N Las Vegas; mine at Arrolime, 20 mi NE of Las Vegas, open pit, limestone
Mine Supt: C R Prince
Mine Frm: John Sanger
Mine Eng: C H Cardwell
1,000-TON ROTARY KILN, Apex
Plant Mgr: C H Cardwell
Prod: 500 tons quicklime

FOOD MACHINERY & CHEMICAL CORP MINERAL PRODUCTS DIVISION
Modesto, Calif
MOUNTAIN SPRINGS MINE, Battle Mountain, 22 mi S of Battle Mtn, open pit, Ba
Gen Mgr: D W McAuley

Gen Supt: A L Allen
Mine Supt: James Jury
Mine Frm: C N Lauritzen
Prod: 200 tons
(See Calif, N Mex and Intermountain Chem co, Wyo)

GABBS EXPLORATION CO
Box 87, Gabbs
Pres: Lee D Dougan
VP: Ellen M Dougan
Sec: J L Dougan, Jr
Treas: W W Dansie
Office Mgr: W Dougan
HORSE CANYON MERCURY MINE, Horse Canyon, Nye County, undergr, oepn pit, Hg
Gen Mgr: L D Dougan
Mine Frm: C V Bentz
Prod: 11 tons
16-TON ROTARY FURNACE MILL, Horse Canyon
Mill Supt: Wm Dougan

GARDNER MINES
Box 413, Ely
Gen Mgr: C A Gardner
MINERAL FARM & MERRIMAR GROUPS, 20 mi SE of Ely, undergr & open pit, Au, Ag, Pb, Zn
Prod: 10 tons
BOSTON MINE, undergr, Au Ag
Prod to start in 1961

GETCHELL MINES, INC
Golconda
Pres: Willis A Swan
Sec-Treas: T L Wilcox
Purch Agt: Ray Osborne
GETCHELL MINE, undergr, & open pit, Au, WO_3
Gen Mgr: William H Hisle
Ch Eng: Joe Graves
Ch Chem: Roy Nojima
Mine Supt: Clair C Chamberlain
Mine Frm: Louis Chatelle
Under devel
Planned prod: 1,500 tons
1,500-TON FLOT-CYANIDE MILL, At mine
Mill Supt: James V Stanford

GOLD BUTTE MINING CO, INC
727 Las Vegas Blvd
Las Vegas
Pres: Frank Florence
VP: Edward Harwood
Sec-Treas & Purch Agt: Fred Masters
SUSAN MINE, Gold Butte, undergr
Gen Mgr: Fred Masters
Asst Gen Mgr: Frank Florence
under devel

GOLD EAGLE MINES, INC
Box 766, Tonopah
Pres: O Roundtree
SALLY LOUISE MINE, Esmeralda County, undergr, Ag, Pb, Zn
Gen Supt: D D Van Wyck
Geol: Wm de Carbonel
Under devel
(See Wash)

THE GOLDFIELD CONSOLIDATED MINES CO
421 Hill St, PO Box 2857, Reno
Pres: Willis A Swan
VP: Irving Guberman
Sec: Geo M Spradling
Treas: Paul G Bruislawn
(See Wash)

GREAT LAKES CARBON CORP
Dicalite Dept, Mng & Mineral Product Div
PO Box 177, Mina
PLANT NO 3, basalt, surface, diatomite
Mill Supt John Graham
(See Calif, Colo, N Mex, Ore)

GREAT WESTERN MINING CORP (NORTH AMERICAN DIVISION)
Gen Offices:
8755 Colgate Ave
Los Angeles 46, Calif
Mine Office:
Box 82, Jean, Nev
Pres: Harry Fracter
VP: D Cauldwell
Sec: J Cauldwell
Asst Sec & Purch Agt: R Faber
Treas: M Landwirth
Sales & Research: David Valandigham
SILVER RAM MINE and MICA QUEEN CLAIM BLOCK, undergr, open pit, Pb, Zn Ag, mica, Be, Cb, Ta, feldspar
Gen Mgr & Geol: D Cauldwell
Prod: 1,000 tons
500-TON WET AND DRY MICA GRINDING MILL, Nipton (pending water supply)
Assayer: Keldon Labs, Los Angeles, Abott-Hanks, San Francisco
(See Calif)

HAMILTON CORP
PO Box 337, Ely
Pres: Morris Engle
ONETHA MINE, White Pine County, Pb, Zn
Under devel

HEIZER, JOHN
Lovelock
HAZEN MINE, Pershing Co, open pit, Fe

INDUSTRIAL MINERALS & CHEM CO
6th and Gilman Sts
Berkeley 10, Calif
Pres: W F Rhoton
VP: A J Hendrickson
Sec-Treas: A L Forbes
JUPITER MINE, Lyon Co, open pit, clay
(See Calif)

ISBELL CONST CO, MNG DIV
Box 2351, 3113 S Virginia Street, Reno
Pres: C V Isbell
Mng Dept: John W Isbell
Ch Eng: H R Noel
Purch Agt: W J Henley
THREE KIDS MINE, Henderson, open pit contract mng for Howe Sound Co, PO Box 2008, Henderson, Mn
Supt: Lloyd Sampson
Mech Frm: R H Waldie
(See Ariz, Wash)

JACKSON MT MNG CO
PO Box 587, Winnemucca
IRON KING MINE, undergr, Fe
Under devel

JUNGO CONTRACTORS INC
Box 587, Winnemucca
Mgr: C Bowe
HUMBOLDT IRON MINE, Humboldt Co, open pit, Fe

KENNECOTT COPPER CORP NEVADA MINES DIV
McGill
Gen Mgr: J C Kennear, Jr
Asst Gen Mgr: M J O'Shaughnessy
Purch Agt: R M Arnn
Div Comptroller: R W Crosser
LIBERTY PIT, VETERAN PIT, Ruth, open pit, Cu, Au, Ag, MoS
DEEP RUTH MINE, Ruth undergr, Cu, Au, Ag, MoS
Mines Plant Supt: R Muse
Ch Eng: L A Green
21,000-TON FLOT CONCENTRATOR, 2 REVERB SMELTERS, McGill
Reduction Plant Supt: B B Smith
Prod: 100,000,000 lbs Cu yrly
NEVADA NORTHERN RY (Subsid)
Gen Supt: H M Peterson
TRIPP PIT, Kimberly, open pit, Cu, Au, Ag, MoS
(See Ariz, N Mex, NY, Utah)

KOLLSMAN MINERAL & CHEMICAL CORP
Fish Lake Valley
B & B QUICKSILVER MINE & MILL, 70 mi SW of Tonopah, Oneonta dist, Esmeralda County, open pit, Hg
Res Mgr: Philip M Gardiner
FURNACE PLANT

LSZ MINING CORP
c/o John A Hedman
PO Box 313, Pioche
MINE, Lincoln Co, Pb, Zn
No Prod

LARSEN INDUSTRIES
Box 367, Murray, Utah
Pres: Vincent A Duff
VP: Paul B Cardon
Sec: David J Stone
Treas:
Purch Agt: George Shuey
MAGIC & RAINBOW MINES, Pershing County, open pit, Au
Gen Mgr: Charles Moore

LONDON EXTENSION MNG CO
Beowawe
Pres: Fred C Bishop
VP: R W Fraser
Sec & Gen Mgr: H C Bishop, Jr
Supt & Treas: R B Warmbrodt
GOLDACRES MINE, 39 mi S of Beowawe, surface, Au, Ag
Supt: E E Mahoney
Mine Frm: Angelo Manconi
Prod: 450 tons
450-TON CYAN MILL, at mine
Supt: C E Stewart
Asst Supt: Harold Bohi

LOWE, D W
RR 1, Box 305, Las Vegas
MINE, barite

LUCY GRAY GOLD MINING CO, INC
2109 Juana Vista Dr
Las Vegas
Pres: James E Martin
VP & Sec-Treas: Ethel F Martin
Dir-Resident: Louise McGuire
(See Calif)

MAGNET COVE BARIUM CORP
PO Box 487, Battle Mountain
FIVE PITS MINE, 23 mi S of Beowawe, Ba
No Prod
MILL, Battle Mountain
(See Ark, Tex, Wyo, Mo, Fla)

MALACHITE CCRP
Sandy Valley
Pres: J Osgood
VP: B Blake
Sec-Treas: M C Blake
COPPER KING MINE, 10 mi from Goodsprings Nev, undergr, Cu, Co, Ni
Gen Mgr: Bill Doty
Asst Gen Mgr: Ben Smith
Geol & Mine Supt: M C Blake
70-TON FLOT & GRAV MILL, Sandy Valley
Mill Supt: M C Blake
Mill Frm: Bill Doty

MANGANESE, INC
(Subsid of Howe Sound Co)
Box 2008, Henderson
Gen Mgr: E B Douglas
Purch Agt: L D Richardson
Cont: Wesley Millick
THREE KIDS MINE, Las Vegas Wash Rd, 6 mi E of Henderson, undergr, surface, Mn
Mine Supt: Charles Hawkins
Ch Plant Eng: R Waters
Mine Eng: Wm O'Neal
Prod: 1,000 tons (mng performed under contract by Isbell Const Co, Reno)
1,000-TON FLOT MILL, at mine
Mill Supt: Ed Lowman
(See Howe Sound Co, NY)

MARTIN, J D, ESTATE OF
905-907 Fulton Fresno Bldg, Fresno 21, Calif
GOOSEBERRY MINE, 15 mi SW of Fernley, Storey Co, undergr, Au, Ag
Mgr: C D Martin

MARY GOLD MINING CORP
Silver Peak
Pres: Wm C McLean
VP: Richard Mitchel
Sec: Victor C Ingram
Treas: Daniel McAhan
MARY MINE, 7 mi W of Silver Peak, Esmeralda County, undergr, Au
Gen Supt: Walt Simmons
Geol: Clyde Keagel
Under Devel

MERCIE MNG & HOLDING CO
5035 W Oak St, Visalia, Calif
Pres & Purch Agt: Capt Carl J Buehler
VP: Irvin C Silverberg
Sec-Treas: Earl Oglevie
ATLASLODE MINE, Winnemucca, 14 1/2 mi W on Hway 49 and 3 1/2 mi N on private road from Winnemucca, open pit, placer, Au, Ag, Pb
Gen Mgr: Carl J Buehler
Asst Gen Mgr: Irvin C Silverberg
Gen Supt: Earl Oglevie
Geol & Metallurgist: Irvin C Silverberg
Under devel
(See Calif)

MEXICAN GOLD & SILVER MNG CO
500 Plumas St, Room 202 Reno
Contractors: Leon Vaughn, George Goff
DIXIE COMSTOCK MINE, Churchill County, undergr, Ag, Au
Under devel

MINERAL MATERIALS CO
1145 Westminister Ave Alhambra, Calif
Gen Mgr: C W Dunton
Ch Eng: M W Redhead
Res Mine Mgr: P W Leidich
Mine Frm: C W Butler
7,000-TON MILL, at mine, jaw crusher, rolls, magnetic separators
BUENA VISTA MINE, 26 mi NE of Lovelock, surface, Fe
Prod: 2,100 tons per shift
(See Calif)

MONOLITH PORTLAND CEMENT CO
643 S Olive St
Los Angeles 14, Calif
VP: Hugh D McBride
GOLDSPAR MINE, 8 mi SE of Bently, open pit, CaF_2
Supt: Ken Swink
(See Calif)

MORGAN & BUSH, INC
Panaca
ROBIN NO 1 CLAIM MINE, open pit, soil conditioner

NAT'L LEAD CO BAROID DIV
PO Box 1675
Houston 1, Texas
ROSSI MINE, Elko County, Ba
SANDERS MINE, Humboldt County, Ba
(See Ark, Calif, Colo, La, Mo, Mont, NY, Tenn, Tex, Utah, Wyo)

NATIONAL MERCURY CORP
11 Sandy Circle, Denver 22, Colo
Pres: Harry H Herman, Jr
VP: David L Wulfsohn
Sec-Treas: Peter D Wulfsohn
PERSHING QUICKSILVER MINE, 22 mi E of Lovelock, Antelope Springs dist, undergr, surface, Hg
Gen Mgr: Harry H Herman, Jr
Under devel

NEVADA GOLD INC
Midas, Via Golconda,
Pres: R T Dunsmore
VP: G M Schlutz
DIXIE GOLD MINE, Au, Ag
Mine Eng: R H T Dunsmore
Prod: 10 tons
Under devel

NEVADA IRON ORE CO
1315 Cornell, Lovelock
Pres: H S Thomas
VP: Arthur Thomas
Sec-Treas: J D Wood
BEACON HILL MINE, Buena Vista Dist, 20 mi SE of Lovelock, open pit, Fe
Gen Mgr & Mine Supt: H S Thomas
Asst Gen Mgr & Mine Frm: R L Ging
Geol: Keith N Meador
Prod: 200 tons

NEVADA-MASSACHUSETTS CO
Tungsten
Pres: C H Segerstrom
VP: M D Cronwall
Treas: M D Jones
Gen Mgr: E Nash
TUNGSTEN MINE, 9 mi N of Mill City, undergr, & surface, WO_3
Mine Supt: D O'Keefe
Mine Eng: Ralph Gronning
No Prod
600-TON GRAV-FLOT MILL, Mill Supt: J R Caldwell

NEVADA PARK MNG CO
Box 63, Foothill Stn, Salt Lake City 8, Utah
Sec-Treas: Richard Knight
NEVADA PARK MINE, Silver Park Mng dist, Lincoln County, undergr, Au, Ag
(Leased to C E Collins, Pioche)

NEVADA PORPHYRY GOLD MINES, INC
10 W 2nd St, Reno
Pres: L D Gordon
Sec: A Silver
MINE, Open pit & placer, Au, Ag

NEVADA SCHEELITE DIV OF KENNAMETAL, INC
430 S Main St, Fallon
Mgr: E M Colwell
Purch Agt: Geraldine Marsh
Ofc Mgr: Don Danner
MINE, near Rawhide, undergr, WO_3
Mech Eng: K L Colwell
Met: Jack Frank
150-TON GRAV-FLOT MILL at mine
Mill Supt: Al Schwartz

NEW PASS MINES
Box 21, Austin
Pres: L Jung
NEW PASS MINE, undergr, Au
Gen Mgr: Don Jung
Prod: 10 tons
30-TON GRAV AND AMALGAMATION MILL, New Pass

NEW POTOSI MINE
Part Own: Peterson, G A
P O Box 230, Mina
NEW POTOSI MINE, Mineral County, undergr, Pb, Au, Ag, Sb
Prod: 5 tons

NEWMONT EXPLOR LTD (LESSEE)
Wagon Wheel Hotel, Wells
SPRUCE MT MINE, 50 mi S of Wells
Spruce Mt dist, Elko County, Pb, Zn, Cu
Eng: M H White
Under devel

NOKAI DOME OIL CO
PO Box 388, Ely
MERRIMAC MINE & GREY EAGLE MILL, 19 mi S of

Ely, Taylor dist, White Pine County, open pit, Sb, Ag
Supt: Roy H Radley
RETORT FURNACE

NORTH AMERICAN DEVEL CO (LESSEE)
Battle Mountain
GOVERNOR MINE, 52 mi NE of Battle Mt, Ivanhoe dist, Elko County, undergr & open pit, Hg
Supt: Earnest T Carlow
FURNACE

PARAMOUNT MINING & DEVELOPMENT CORP
Arden
Pres: C H Troxell
(See Calif)

PEDRO, JOHN
PO Box 501, Lovelock
YOUNG ANOMLEY MINE, 28 mi SE of Lovelock, Buena Vista dist, Pershing County, open pit, Fe

PETERSON, M F & LORENA
Box 131, Tonopah
OLD COWGIRL MINE, 50 mi NE of Tonopah, undergr, Au, Ag
Under devel
M & M (MERCURY MT) MINE, 47 mi NE of Tonopah, undergr, Hg
Prod: 2 tons

REYNOLDS, ARTHUR R, SR
Box 2562, Salt Lake City 10, Utah
IRON GOLD MINE, Goodsprings, Clark Co, undergr, Cu, Au, Ag
Mine Frm: Leroy F Jacobson
Under devel

RUBY HILL MNG CO
Eureka
Pres: F S Mulock
VP: R J Hendricks
Treas: Francis Fiske
RUBY HILL MINE, undergr
Gen Mgr: J S Livermore
Eng: W Paroni
Under explor

RUGGLES, A L MNG CO
Cherry Creek
LAUGHING INDIAN GROUP, 3 mi S of Cherry Creek in Egan Canyon, undergr, WO_3
Under devel
EXCHEQUER PATENTED MINES, Au, Ag
URANIUM CLAIMS, Telegraph mng dist
Under devel

SHELTON BARITE MINES
PO Box 132, Battle Mtn
Pres: Edith L Shelton
Gen Mgr: Lawrence A Shelton
MINE, open pit, Ba
Mine Supt: Calvin E Shelton
Asst Mine Supt: Alfred C Shelton
Prod: 150 tons

H A SHIFFER ASSOCIATES SCIENTIFIC FOUND, INC
108 N 3rd St, Las Vegas
Pres: H A Shiffer
VP: R James
Sec: A E Beaumont
Treas: Ann Wishnoff
Purch Agt: Walter Wernecke
Nevada Counsel: Robert Cohen
(See Calif)

SHORTHORSE MNG CO
207 S 9th, Las Vegas
Pres: Robert L Snyder
Sec-Treas: Reba Snyder
ORO AMIGO MINE, Goodsprings, undergr, Cu, Au, Pt, Co
Gen Mgr: Robert L Snyder
Gen Supt: Bill Doty
Geol: Wayne Fox
Under devel

J R SIMPLOT CO, MINERALS & CHEM DIVISION
Box 912, Pocatello, Idaho
Pres & Gen Mgr: J R Simplot
SIMPLOT IRON MINE, Carlin, loc 26 mi S of Palisade, open pit, Fe
Gen Mgr: O E Pothier
No Prod
(See Idaho, Mont, Wyo)

SIMPLOT SILICA PRODS, INC
Box 308, Overton
Pres: J R Simplot
VP: W Grant Kilbourne
Sec: Lloyd Haight
Treas: John M Dahl
MINE, open pit, silica
Gen Mgr: Keith Madill
Asst Gen Mgr: Don Ferguson
Gen Supt: Leo Sneed
Prod: 550 tons
SIMPLOT IRON MINE, 26 mi S of Palisade, open pit, Fe
No Prod
550-GRAV MILL, at Overton
(See J R Simplot Co, Idaho, Mont, Wyo)

SISKON CORP
422 Gazette Bldg, Reno
Pres: H B Chessher, Sr
VP: H B Chessher, Jr
E J Shrader
Sec: J E Chessher
Asst Sec & Asst Treas: A L Chadek
MAGGIE CREEK MINE, PO Box 899, Reno, 12 mi N of Carlin, open pit, Cu
Gen Mgr: H B Chessher, Sr
Gen Supt: H B Chessher, Jr
Met: H L Hazen
Mine Supt: M R Bissell
Under devel
(See Calif, Mont)

STANDARD SLAG CO
Box 3 Gabbs
Pres: L A Beeghly
VP: W E Bliss
Sec-Treas: R M Lynch
Western Mgr: R O Jones
Western Aud: W E Williams
GREENSTONE MINE, 2 mi E of Gabbs, open pit, magnesite
Gen Mgr: R O Jones
Gen Supt: G B Gaylord
Mine Supt: M Evasovic
Mine Frm: A C Wood
MILL, Gabbs
Mill Supt: W C Burnett
Asst Mill Supt: W C Maher
IRON MT MINE, Gabbs, open pit, Fe
MINNESOTA MINE, Yerington, open pit, Fe
(See Ohio)

STAR DUST MINES, INC
#4, 283 E South Temple
Salt Lake City, Utah
Pres & Gen Mgr: Fred Cook
VP: Leslie J Battey
Sec-Treas: W N Nance
Purch Agt: M V Cook
STAR DUST MINES, Baker, Nevada, open pit, quartzite
Mine Supt: Fred Cook
Prod: 6 tons
(See Utah)

STORMY DAY MINES
435 Hillcrest Rd
San Mateo, Calif
Pres: Robert N Avery
VP: Alfred W Stickney
Sec: M J Scholz
STORMY DAY MINE, Pershing County, undergr, WO_3
No Prod

STRODE, E D
Spring Valley Rt, Ely
KANSAS MINE, undergr, Cu, Au, Ag
Prod: 20 tons

SUNBURST, INC
1975 N W Everett St
Portland 9, Oregon
Gen Mgr: J C Young, Kay Critchlow
SAN JUAN PROPERTY, Lander County, undergr, U_3O_8
No Prod
TRADER HORN MINE, Box 968, Tonopah, Nye County, undergr, Au, Ag
Under devel
(See Ore, Utah)

SUNRISE MINING CO
2545 E Charleston, Las Vegas
Own: George E Warner
SUNRISE MINE #1, 2, 3, Nelson-Searchlight Mt, undergr, open pit, Au, Ag, flagstone
Under devel

TANNISSE URANIUM MNG CO OF NEVADA
2409 Isabelle Ave
Las Vegas
Pres & Treas: R L Farnsworth
VP & Sec: E H Farnsworth
Purch Agt: E H Swenson
BARBRA MINE, Ag, Au
under devel

TATE MINE DEVEL & SUPPLY COMPANY
459 5th St, PO Box 1126
Hawthorne
Own: M L Tate

TUNGSTEN MT MNG CO
511 Securities Bldg
Seattle 1, Wash
TUNGSTEN MT MINE, NE of Fallon
MILL
(See Wash)

UHALDE LEASE
1975 Palisade Dr
Reno
Oper-Mgr: John H Uhalde
ALLADIN MINE, 28 mi SW of Elko, undergr, Pb, Ag, Cu
Under devel
BONNIE MINE, 28 mi SW of Elko, undergr, Cu, Ag
Under devel

UNION CARBIDE NUCLEAR CO
(Division of Union Carbide Corp)
Exploration Dept
220 N Arlington Ave, Reno
Research Geol: H E Vitz
(See Calif, Colo, NY, Utah, Wyo)

U S GYPSUM CO
300 W Adams St, Chicago, Ill
QUARRY, Lovelock, open pit, perlite
Works Mgr: Z G Turley
QUARRY, Empire, open pit, gypsum
Works Mgr: Z G Turley
(See Calif, Colo, Conn, Ind, Iowa, Mass, Mich, N Mex, Mont, Okla, Ohio, NY, Tex, Utah, Va)

UNITED STATES MLG & MINERALS CORP
Silver Peak
Pres: Samuel L Levine
Sec: Manuel J Robbins
Asst Sec: Jack L Sachs
Treas: Eugene B Raymond
Purch Agt: James O Wike
OHIO, MOHAWK & TONOPAH KING MINES, Silver Peak, undergr, Au, Ag
Gen Mgr: Remo O Camozzi
Met: Fred T Yarcho
Frm, Ohio mine: John S Wertz
Frm, Mohawk Mine: Lewis Shirley
Frm, Tonopah King: Wm F Jameson
Prod: 200 tons
300-TON CYANIDE MILL, Silver Peak
Mill Supt: Fred T Yarcho
Asst Mill Supt: Henry Albright
Assay: Louis Warnken, Jr

UPPER PARADISE MINES ASSOC INC
108 N 3rd St, Las Vegas
Pres: H A Shiffer
Sec: A E Beaumont
Purch Agt: W Wernecke
(See Calif)

VALLEY ENGINEERING & DEVEL CO
Mountain City
SOUTH FORK MINE, Elko County, open pit, U_3O_8

VAN VOORHIS, B W, JR (CONTRACTOR)
SEGERSTROM-HEIZER MINE, Box 298, Lovelock, 30 mi SW of Lovelock, Pershing County open pit, Fe
Supt: A C Ruggles

WELLS CARGO, INC
Box 430, Las Vegas
Pres: J W Wells
VP: H A Wells
Sec: R C Wells
Purch Agt: Bruce Lane
CARP FLUORSPAR MINE, Lincoln County, open pit, fluorspar
(See Ariz)

WESTERN SILICA CO
1730 Locust Ravine
Bakersfield, Calif
SNOW WHITE MINE, 15 mi S of Goldfield, undergr, silica
Supt: William Peterson, Goldfield
WESTERN SILICA PLANT, crushing & sizing plant
Mgr: Irving Feldcamp

WHELCHEL MINES CO
1019 Arthur St, Caldwell, Idaho
Pres: William E Whelchel
VP: Ralph A Whelchel
Sec-Treas: Theresa M Whelchel
NATIONAL MINE, McDermitt, Au, Ag
Under devel
10-TON PILOT GRAV MILL, being installed
(See Utah, Idaho)

WHITE CAPS GOLD MNG CO
317 Clay Peters Bldg
140 N Virginia, Reno
Pres: Philip Barelli
VP: Carson Fraziani
Sec-Treas: Walter Naismith
WHITE CAPS MINE, Manhattan, Au, Sb, Hg
Gen Mgr: Hugh Cameron
Gen Supt: Cleveland Charley
Geol & Met: Albert Silver
Mine Supt: Tom Charley

WICHNER, MILTON
6305 Yucca Street
Los Angeles
POWLER-REEVES MINE, Mineral & Nye Counties, Nevada, open pit, diatomaceous earth
No Prod
MILL, Mina
No Prod

YALE GOLD MNG CO
Midas
Supt: J M Simpson
MINERS GOLD MINE, undergr, Au, Ag

YOUNG AND CRITCHLOW
1975 N W Everett St
Portland 9, Oregon
Own: James C Young, Kay Critchlow
COALDALE MINE, Esmeralda County near Coaldale, undergr, U_3O_8
No Prod
PEERLESS SILVER & GOLD PROPERTY, Near Austin, Lander county, Au, Ag
No Prod

NEW HAMPSHIRE

BON AMI MNG CO, INC
445 Park Avenue, NY 22, New York
RUGGLES MINE, Grafton
undergr & open pit, feldspar mica, beryl, spodumene
Mine Supt: P B Verplanck
No Prod
(See NY)

FOOTE MINERAL CO
18 W Chelten Ave
Philadelphia 44, Pa
COLD RIVER MINE, Bellows Falls, at Cold Riv, undergr, feldspar
Gen Mgr: George Kneass, Jr
(See NC, Pa, Tenn, Va)

TRUSIANI MNG CO
Brunswick, Maine
BERYL MOUNTAIN MINE, Acworth, beryl & glass grad quartz

NEW JERSEY

ALAN WOOD STEEL CO
Conshohocken, Pa
Pres: H R Wood
VP, Oper: W E Boger
Sec-Treas: W M Webb
Purch Agt: Clinton Bishop
SCRUB OAK MINE, Mine Hill, undergr, Fe
Supt: J P Kerttu
Mine Supt: K Sherbok
Gen Mine Frm: S J Usinowicz
Master Mech: Joseph Speicher
Mine Eng: R J White
WASHINGTON MINE, Oxford, undergr, Fe
Mine Supt: R M McInerney
Mine Frm: J Sadlon
Mine Eng: L Fyfe
576-TON GRAV MILL, at mine
Mill Supt: E F Zulauf
3,500 TON GRAV-MAGNETIC MILL, Mine Hill
Gen Mill Frm: N K Karchmer
Assayer: W F McDougal
BLAST FURNACE, Swedeland, Fe
Supt: T J Wells, R T Flowers
(See Pa)

ALLIED CHEM CORP
(GEN CHEM DIVISION)
PO Box 70, Morristown
Pres: F J French
VP: J S Brown
Purch Agt: J A Simpson
Mgr Mng Oper: W J Trepp
Asst Mgr Mng Oper: J R Pennington
Geol: H E Puttuck
(See Colo, NY, Va)

AMERICAN SMELTING & REFINING COMPANY
Box 151, Perth Amboy
PERTH AMBOY PLANT
Mgr: G H Weis
Gen Supt: C B Porter
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, Nebr, N Mex, NY, Tex, Utah, Wash)

GEORGIA KAOLIN CO
433 N Broadway, Elizabeth
MINE & PLANT Ga
(See Ga)

THE GLIDDEN CO
900 Union Commerce Bldg, Cleveland, Ohio
Pres: Dwight P Joyce
VP: G M Halsey
Sec: R D Horner
Treas: W G Phillips
Purch Agt: R L Loxon
VP, Eng: J W Pollard
LAKEHURST MINE, PO Box 5, Lakehurst, placer, ilmenite
Gen Mgr: I R Quirk
Geol: H N Cannon
Under devel
GRAV-HIGH TENSION-MAGNETIC MILL, Lakehurst
(See Ohio)

INTERNATIONAL SMELTING & REFIN CO
25 Broadway, New York, NY
RARITAN COPPER WORKS, Perth Amboy, Middlesex Co
(See Ariz, NY, Utah)

MINERALS & CHEMICALS PHILIPP CORP
Menlo Park
MINES, Fla
(See Fla, Ga)

NEW JERSEY ZINC CO, THE
160 Front St, New York 38 NY
Pres: R L McCann
VP, Mng & Explor: S S Goodwin
STERLING MINES, Ogdensburg, Zn
Supt: D McKechnie
No Prod
(See Colo, Ill, N Mex, Pa, Tenn, Va, Wisc)

SHAHMOON INDUSTRIES INC
55 Liberty St, NY 5, NY
MT HOPE MINE, Mt Hope, undergr & open pit, magnetite
MILL, at mine
(See NY)

UNITED CLAY MINES CORP
101 Oakland St, Trenton 6
Pres: B F Gentsch
VP & Gen Mgr: G W Lee
VP & Tech Dir: G W Phelps
Sec: W L Rider
Treas: W F Guenther
Oper Mgr. W L Rider
(See Md, Fla, Ga, Tenn, SC)

U S METALS REF CO
(Subsid of AMER METAL CLIMAX INC)
61 Broadway, NY 6, NY
Pres. Hugo de Nevfille
VP: E T Rose
H A Vogelstein
J Vuillequez
J Payne, Jr
Sec & Asst Treas: E A Weil
Treas: Donald J Donahue
Dir of Purch: D Keliher
Control. L S Cline
ELECTROLYTIC SMELTER & REFINERY, Carteret
Gen Mgr. John Towers
Prod: 170, 000 tons Cu per yr
25, 000, 000 oz Ag per yr
600, 000 oz Au per yr
(See Amer Metal Climax, Inc NY)

NEW MEXICO

AMBROSIA LAKE URAN CORP
Kerr-McGee Bldg, Oklahoma City 2 Okla
MINE, U_3O_8

AMERICAN-PERU MNG CO
1515 Paul Brown Bldg St. Louis, Mo
KEARNEY & PEWABIC MINES, Hanover near Bayard, undergr, Zn, Pb
Gen Mgr: J W Faust
Geol: Hans Schrieber
Mine Supt J Conley
1200-TON FLOT MILL, Peru Hill near Deming
Mill Supt. S T McBee
(See Amer Zinc Lead & Smelting Co, Mo)

AMERICAN SMELTING & REFINING CO SOUTHWESTERN DIV
813 Valley Nat'l Bank Bldg Tucson, Ariz
Mgr: T A Snedden
Asst Mgr. A C Hall
Ch Geol: Kenyon Richard
GROUND HOG UNIT, Vanadium N Mex, undergr, Pb, Zn
Supt. L H Chapman
No Prod
DEMING MILLING UNIT
600-TON FLOT PLANT
Supt. L H Chapman
No Prod
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, Nebr, N J, N Y, Tex, Utah, Wash)

ANACONDA CO, THE NEW MEXICO OPER
Box 638, Grants
Mgr: A J Fitch
Asst Mgr E C Peterson
Gen Mill Supt W J Roberts
Met: Dale C Matthews
Mine Supt: John P Herndon
Asst Mine Supt: F J Balentine
Geol: R D Lynn
Mech Supt: T M Fitch
Ch Chem: Jack R Pate
Ch Clerk: F G Holmberg
JACKPILE MINE, open pit, U_3O_8
Prod: 3000 tons
3, 000-TON LEACHING PRECIP MILL, Bluewater
Mill Supt: W J Roberts
Ch Chem: Robert Miller
(See Calif, Idaho, Mont, Nev, NY)

ANSCHUTZ DRILLING CO INC
1411 Mile High Center Bldg, Denver, Colo
Pres: A M Alloway
VP: J H Cazier
EAST MAGDALENA MINE, 5 mi E of Magdalena, Zn, Pb
Mng Mgr: J H Cazier
Geol: Louis Gaz
Under devel
(See Colo, Utah, Wyo)

ASTRO ENTERPRISES, INC
523 Third St, NW, Albuquerque
Gen Mgr: J V Reynolds
BLACK HAWK, RED BLUFF MINES, Valencia County, U_3O_8
BUNNEY, GAY EAGLE MINES & UDC GROUP, Valencia County
Under devel

BANNER MINING CO
PO Box 5805, Tucson, Arizona
Pres: L L Travis
VP & Gen Mgr: A B Bowman
VP: John M Wallace
Sec-Treas: James E Hogle
Ch Acct & Asst Sec: F C Prince
BONNEY-MISERS CHEST MINES, Lordsburg, undergr, Cu, Ag
Gen Supt: F M Bowman
Mine Eng: E Reynoso
Chem: E C Thompson, Jr
400-TON FLOT MILL
Mill Supt: F E Johnson
(See Ariz)

BARRETT, CLARENCE
Box 382, Socorro
COPPER GOLD NO 10 MINE, Socorro County, Au, Ag

BEARUP, C D
Fierro
MINE, Grant County, Au, Ag, Cu, Pb, Zn

BIBO, ARTHUR
2718 Morrow Rd N E, Albuquerque
HAYSTACK # 1-20 MINES undergr, U_3O_8
Gen Mgr. James Mallery
Prod: 200-300 tons per mo

BLACK CANYON MINE
PO Box 282, Socorro
Part: L A Goret
Valente Aguilar
BLACK CANYON MINE, undergr, Mn
Gen Mgr: L A Goret
Mine Supt: Lewis Aguilar
Prod: 100 tons
100-TON MILL, 1 mi W of Socorro
Mill Supt. Bobbie Pace

BLACK RANGE PROSPECTING & DEVEL CO
Kingston
Pres: J H Schoonmaker
VP: Pat Bradley
Sec. Ann Bradley
BLACK JACK GROUP, Al, Bi, Cu, Au, Fe, Pb, Mn, Ag, WO_3, Te, Zn
VIC WAGONER GROUP, Cu, Pt, Ag, Zn
TUNGSTEN SILVER GROUP, WO_3, Au, Ag
RED ROCK GROUP, Ag, Fe
KING MIDAS GROUP, Cu, Au, Pb, Mn, Ag, Zn
AZTEC GROUP, Cu, Au, Fe Pb, Mn, Ag, Zn, U_3O_8

LITTLE WILLIE MINE, Cu, Pb, Mn, Ag
SILVER LINING GROUP, Cu, Au, Fe, Pb, Mn, Ag, Zn
Gen Mgr: J H Schoonmaker
Asst Gen Mgr: Jack Graves
Geol-Met: Anthony Lane
20-TON FLOT-GRAV MILL, Middle Percha
Assay: J H Schoonmaker

BOYLES BROS DRILLING CO
1624 Pioneer Rd, PO Box 58, Salt Lake City, Utah
Pres: R T Goldsworthy
VP: H L Baker
Sec: A F Goldsworthy
Treas: V L Stevens
Purch Agt: A P Tucker
Compt: E D Haddon
MARY NO 1 & ENTRADA MINES, Grants, undergr, U_3O_8
Gen Mgr: V L Stevens
Asst Gen Mgr: F E Peters
Geol: A K Guard
Mine Supt: Earl Haldeman
Prod: 250 tons
Under devel
(See Utah)

BRANNAN & FULLER
Box 266, Silver City
Gen Mgr: Ted Brannan
Sec-Treas: Marvin Fuller
ATWOOD & HENRY CLAY & EIGHTY-FIVE MINES, Box 546, Lordsburg, undergr, Cu, Ag, Au
Gen Mgr: Ted Brannan
Mech Eng: J M Parson
Mine Frm: Leslie Harvell
Under devel
Prod: 150 tons

CALUMET & HECLA, INC URANIUM DIV
Box 906, Grants
Pres & Gen Mgr: Paul Dashine
Dir Emp & Pub Rel. H D Stott
Controller: B C Peterson
MARQUEZ MINE, Ambrosia Lake, undergr, U_3O_8
Mine Mgr: R W Kliebenstein
Mine Capt: G C Johnston
Geol: T A Boyden
Main Supt: W Zenz
Mine Eng: R A Hays
Prod: 500 tons
(See Ill, Mich, NY)

CARPENTER, MC MILLAN & SALTER
8271 Carpenter Rd, El Paso, Tex
MINE, Grant County, Au, Ag, Cu, Pb, Zn

CASTILE MNG CO, INC
1033 Humble Place, El Paso, Tex
Pres. C Huckleberry
MINE, open pit, gypsum

CENTENNIAL DEVELOPMENT CO
Box 725, Grants
Pres: H B Spencer
SEC 8 13 N 9W MINE, McKinley County, U_3O_8
(See Ariz, Utah)

CHAMBERLIN LEASE
c/o Robert Chamberlin, Gen Mgr, Magdalena
WALDO MINE, Socorro County, Au, Ag, Pb, Cu, Zn

CHENA MINING, INC
General Del, Grants
LA JARA MINE, Valencia County, U_3O_8

CLUTE CORPORATION
Box 706, Santa Fe
Supt: H J Long
MILL, mica
Under devel

CONSLER, IDA L
Rainbow Trailer Court, Alamagordo
BONANZA MINE, Lincoln County, Au, Ag, Cu, Pb, Zn

CORDILLA MNG CO
Dixon
HARDING MINE, pegmatites

DALCO URANIUM, INC
Box 585, Grand Junction, Colo
BARBARA J & DALCO MINES Grants, undergr, U_3O_8
Mine Supt. A H Baldo
Asst Mine Supt: D W Wilson
Gen Supt: A H Baldo
Gen Mgr: J O'Connor
Prod: 50 tons

DUVAL SULPHUR & POTASH CO, POTASH DIV
Box 510, Carlsbad
Res Mgr: J E Tong
Ch Eng: B F McGuire
Purch Agt: J R Smith
MINE, 21 mi NE of Carlsbad undergr, potash
Prod: 3, 000 tons
Mine Supt: R H Taylor
Mine Frm: J J Gasparich
Mine Eng: H L Shively
FLOT MILL
Mill Supt: M H Harrison
Mill Frm: W M Bourn
(See Ariz, Tex)

EADS MINING CO
420 Grand Ave, NE, Albuquerque
SAN MIGUEL MINE, Sandoval County, Au, Ag, Cu, Pb, Zn

ENTRADA CORP
619 Sims Bldg., Albuquerque
Pres: E W Cannedy
VP: A A Hunt
Sec & Treas: Mary S Cannedy
MARY #1 MINE, undergr, U_3O_8
Prod: approx 500 tons

FARM CHEMICAL RESOURCES DEVEL CORP
504 N Canal St, PO Box 870 Carlsbad
Pres & Gen Mgr: E F Kindsvater
VP: G J Talbott
D A McGee
Sec: C F Brannan
Treas: H H Raborn
Purch Agt: W G Hensley
Chmn of Bd: J G Patton
POTASH MINE, Eddy & Lea Counties near Artesia
Under devel
(Joint venture of Kerr-McGee, Phillips Petroleum Co and Nat'l Farmers Union)

FEBCO MINES
PO Box 687, Grants
RIALTO MINE, McKinley County, U_3O_8

FINCH, JOHN J
Box 422, Silver City
HOMESTEAD GROUP, 3 mi NW of Pinos Altos, undergr, Cu, Ag
Under devel

FOUR CORNERS EXPLORATION CO
Box 116, Grants
Gen Mgr. Irving Rapaport
Geol. Forrest Fincher
Gen Supt: L D Barry
DOG, HOGAN & MALPAIS MINES, McKinley County, undergr, U_3O_8

FRANCES MINERAL RESOURCES CO, INC
Box 38, La Madera
FRANCES RED MINE, mica
Gen Mgr & Sec. E A Teleucky
Under devel

GALBAR, INC
PO Box 3, Carlsbad
Pres. Lee Downey
MEX-TEX MINE, undergr, open pit, Pb, Ba
Gen Mgr: Lee Downey

GAMCO (GORET AGUILAR MNG CO)
PO Box 954, Lordsburg
Gen Mgr: L A Goret
GAMCO MINE, undergr, Pb, Cu
Gen Mgr: Valente Aguilar
Under devel
FLOTATION MILL being built at Lordsburg

GIBRALTAR MINERALS CO
Box 66, Hachita
Pres: Harold Hinn
VP: Harry Riggs
AMERICAN MINE, Hachita, undergr, Pb, Ag
Mgr: Charles G Gardner
Mine Frm: G Ortega
Prod: 40 tons
60-TON FLOT MILL, Hachita
Mill Supt: Charles G Gardner

GOSILE CORPORATION
116 Fannin St, San Antonio, Tex, 120-1/2 E Pine, Deming
Pres: Walter B Walters
VP: Keith Lyons Sr
Sec: Jack V Gates
Treas. Henry W Uecker
Purch Agt: W B Walters
Atty: Robert H Rice
ATIR GROUP, PO Box 786, Deming, Fla dist, Luna Co, undergr & open pit, galena, CaF_2, Ag, Au
Gen Mgr: W B Walters
Asst Gen Mgr: C D Milliken
Gen Supt, Mng: E Nichols
Mine Frm: Marcial Borrego
Asst Mine Supt: R W McCoy
Prod: 20 tons
50-TON AIR "SCALPING", FLOT-GRAV MILL, Deming
Mill Supt: C D Milliken
Mill Frm: Joe B Schafer
(See Tex)

GREAT LAKES CARBON CORP, MINING & MINERALS PROD DIV PERLITE DEPT
Box X, Socorro
BLANCA VISTA MINE, 4 mi W of Socorro, surface, perlite
Ch Geol: J W Reinhart
MILL, Socorro
Mill Supt: A K Muir
(See Calif, Colo, Nev, Oreg)

GREAT WESTERN MINERALS
408 S Allen Ave, Monahans, Tex
BLACK COLT MINE, Hillsboro, Ag
Mine Frm: R Tirey
Under devel

HALE, E H
Hillsboro
LUCKY THREE MINE, Grant County, Au, Ag, Cu, Pb, Zn

HARDING MINE, THE
PO Box 197, Dixon
Own: Arthur Montgomery
HARDING MINE, undergr, Be, spodumene, lepidolite, microlite, Cb
Mgr. Hugh R Van Wagenen
Mine Frm: Eliseo Griego
FLOTATION & GRAVITY MILL to be built at mine, cap 100 tons daily

HAYSTACK MT DEVEL CO, (A subsid of SANTA FE RY CO)
80 E Jackson Blvd Chicago 4, Ill
Pres. E S Marsh
VP: R O Rydin
Sec-Treas. C A Holcomb
Purch Agt: F J Steinberger
HAYSTACK & POISON CANYON MINES, Prewitt, open pit, undergr, U_3O_8, V_2O_5
Gen Mgr-Ch Mng Eng: T O Evans
Gen Supt: L G Fuller
Prod: 200 tons
SECTION 23-13-10 & SECTION 25-13-10 MINES, McKinley County, U_3O_8
Mine Supt: L G Fuller
Asst Mine Supt: R Gothleib

HELLAMAE MNG CORP
PO Box 218, Terminal
Pres: Chas M Day
HELLAMAE MINE, NW of Silver City, open pit, perlite
Met: Prof G U Greene
Under devel

HIDDEN SPLENDOR MNG CO, THE
PO Box 2306, Salt Lake City 10, Utah
N MEX PROPERTIES,

Ambrosia Lake, U_3O_8
Gen Supt: Harold Powers
Asst Gen Supt: D D Turberville
Mine Supt: M F Fletcher, Sr
Ch Eng & Geol: W D Collins
DYSART 1 & 2 SHAFTS
Mine Supt: Harold Powers
(See Utah, Wyo)

HOMESTAKE-NEW MEXICO PARTNERS
PO Box 266, Grants
Gen Mgr: Clyde Osborn
Asst Gen Mgr: R J Stoehr
Ofc Mgr. C E Markosky
Purch Agt: Geo Lowe
SECTION 32 MINE, Ambrosia Lake undergr, U_3O_8
Mine Supt: Dean Crossland
Mine Eng: R Steele
Prod: 300 tons
630-TON CARBONATE LEACH PLANT, 6 mi NW of Grants on Hwy 53
Mill Supt: Clyde N Garman
Asst Mill Supt: Homer Derrer
Ch Met: F N Oberg
Ch Chem: John Wesley
Control Eng: Harvey O Birg
Elec Frm: B W Brown
Mech Frm: Royce M Bricker
Sampl Plant & Yd Frm: Robt W Strammier
(See Homestake Mng Co, Calif, S D, Utah, Wyo)

HOMESTAKE-SAPIN PARTNERS
Box 99, Grants
Mgr: L W Swent
SECTION 15, 23, & 25 MINES, Grants, undergr, U_3O_8
Supt: D T Delicate
Frm: G A McMillan
Eng: E A Graber
Prod: 1650 tons
1650-TON MILL, Grants, U_3O_8
Supt: J Q Jones
Asst Supt: "Tex" Crosby
Assayer: A H Jones
(See Homestake Mng Co, Calif, S D, Utah, Wyo, also Sabre-Pinon Corp, N Mex)

INTERNAT'L MINERALS & CHEM CORP AGRI CHEMICAL DIV
5401 Old Orchard Rd, Skokie, Ill
CARLSBAD POTASH MINE, Box 71, Carlsbad, undergr, KCl_3 & K_2SO_4
Opns Mgr. E C Skinner
Geol: R Hougland
Mech Eng: Paul Wright
Mine Supt: M W Kartchner
Mine Eng: R H Lane
Met: Al Adams
Elec Eng: R W Wentland
Prod: 13, 000 tons
14, 000-TON FLOT MILL, at mine
Mill Supt: W N Stanley
(See Ariz, Fla, Ill, Maine, Miss, NC, S D, Tenn, Va, Wyo)

JOHNS-MANVILLE PRODUCTS CORP
22 E 40th St, New York 16, N Y
Pres: C B Burnett
VP: K W Huffine
Sec: H M Ball
Treas: J M Shackleford
Purch Agt: D H Lyons
MINE, office at Antonito, Colo, mine at No Agua, N Mex, open pit, perlite
MECH SEPARATION MILL, at mine
(See Calif, Colo, N Y)

K S N COMPANY, INC
PO Box 327, Grants
Pres: R C Kirchman
MINE, U_3O_8

KENNECOTT COPPER CORP, CHINO MINES DIV
Hurley
Gen Mgr: E A Slover
Div Purch Agt: C N Dempsey
CHINO MINES, Santa Rita, open pit, Cu, MoS
Mine Supt: J M Haivala
Pit Supt: W E Herkenhoff
Maint Supt: D G Thorne
Mine Eng: H A Wilmeth
FLOT MILL, Hurley
Mill Supt: F D Thayer
BLAST FURNACE, Hurley
Supt: W C Dow
REDUCTION PLANT
Supt: R J Stevens
Maint Supt: M M McGee
(See Ariz, Nev, NY, Utah)

KERMAC NUCLEAR FUELS CORP
(Owned by Kerr-McGee Oil Industries, Inc)
PO Box 218, Grants
Pres: D A McGee
Exec VP: George H Cobb
Sec-Treas: P A Puttroff
VP & Gen Mgr: M F Bolton
Maint Mgr: Baxter Blitz
Explor Mgr: E E Jones
Purch Agt: G A Ruster
6 MINES, Ambrosia Lake, undergr, U_3O_8
Mines Mgr: P S Cross
Div Mine Mgr: E S Rendall
Mine Geol: F C Hohne
Prod: 3, 300 tons
3300-TON MILL, ION-EXCHANGE, Ambrosia Lake
Mgr: H R Keil
Met: R J Woody
Supt: D O Carlson
(See Kerr-McGee, N Mex)

KERR-McGEE OIL IND, INC, NAVAJO URANIUM DIV
PO Box 608, Shiprock
Gen Mgr: C L Wise
SOLVENT EXTRACTION MILL, Shiprock
Mill Supt: J Maxwell
Ch Met: M N Shaw
Gen Frm: Al Cynova
Ch Chem: A MacAllister
Maint Supt: T E Kyle
Plant Eng: John Shive
(See Ariz, Colo, Okla, Wyo, & Kermac Nuclear Fuels, N Mex)

LANCE CORP
Box 187, Grants
BLACK JACK #1 & 2 MINES, Smith Lake, undergr, U_3O_8
(Subsid of Sabre-Pinon Corp, Santa Fe, N Mex)

LEACH, ALBERT A
PO Bin U, Lordsburg
LADY FRANKLIN GROUP, Ag, Au, Mn
COLOSSAL-MIDNIGHT, Cu, Au, Ag
RESERVATION-MINNEAPOLIS, Au, Ag, Pb
ALHAMBRA GROUP, U_3O_8, Ag, Ni, Co
ALASKA GROUP, GOLDEN LINK GROUP, MALONE GROUP, Au, Ag
FLOYD COLLINS GROUP, White Signal dist, Grant County, U_3O_8

LONE STAR MNG & DEVEL CORP
235 Korber Bldg, Albuquerque
Pres: W L Davidson
VP: James A McKinnon
Sec-Treas: W C Oestreich
LA BAJADA MINE, undergr & open pit, U_3O_8
Gen Mgr: Susquehanna-Western Corp
Under devel

LUCK MNG CO
215 Market St, San Francisco 5, Calif
BOSTON HILL MINE, Box 29, Silver City, Fe, Mn
Gen Mgr: L F Zant
Eng: H W Gould & Co
Gen Supt: J F Hutchins
(See Calif)

LUMMUS, R H & HOLMES, C E
Box 7131, Inwood Sta
Dallas 9, Texas
BIG CHIEF No 4 MINE, U_3O_8
Socorro Co, N Mex
No prod
PITCHBLEND WATERCAN, Sierra County, U_3O_8
No Prod

MATHIS & MATHIS
PO Box 452, Silver City
IRON HEAD CLAIM & PEARSON PIT, near Fierro, Fe

MID-CONTINENT URANIUM CORP
Uranium Center Bldg, Grand Junction, Colo
Pres: Norman E Ebbley
VP: Norman E Gillespie
Sec-Treas: Mark D Dunn
Purch Agt: John E Danielson
BARBARA J #3, near Grants
(Leased to Williams Mng Partnership, c/o John McNulty, 200 N 6th St, Grand Junction, Colo)
(See Colo)

MINNESOTA MNG & MLG
Box 452, Silver City
Gen Mgr: R W Mabbitt
Pers in Chg: T O Garcia
LONE PINE MINE, Te
Under devel

E P MOE MINING
PO Box 386, Grants
Sec: Louise Lowery
E P MOE MINE #5, 16 mi NW of Grants, undergr, U_3O_8, V_2O_5
Gen Mgr: E P Moe
Gen Mgr & Mine Supt: C C Kugel
Mine Frm: Ray McKenzie
Prod: 75 tons

MOGOLLON MINERALS
PO Box 5, Mogollon
Pres: James R Wray
BABY MINE, Mineral Cr, 3 mi N of Mogollon, undergr, U_3O_8, V_2O_5, Ag, Au, Cu
Gen Mgr: James R Wray
Gen Supt: James Stanley
Mech Eng: Edward Warren
Under devel
KORDIC MINE, E of Mogollon, open pit, MnO_2
No prod

MOLYBDENUM CORP OF AMERICA
Questa
Pres: Max Hirsch
VP: E A Lucas
Treas: Wm B Kuntz
Gen Mgr: A L Greslin
MOLY MINE, 7 mi E of Questa, undergr, Mo
Supt: Jose Varela
Under devel
200-TON FLOT MILL
Supt: Robert Crel
No prod
(See Calif, Colo, NY, Pa)

NATIONAL POTASH CO
PO Box 731, Carlsbad
MINE, 30 mi E of Carlsbad undergr, potash
Gen Mgr: T G Ferguson
Asst Gen Mgr: G L Jordan
Elec Eng: D F Parker
Ch Process Eng: B M Fisher
Mine Supt: C E Grosso
Mine Eng: R E Billman
FLOT CRYSTALLIZATION MILL, at mine
(See NY)

NEW JERSEY ZINC CO
160 Front St, New York, NY
VP, Mng & Explor: S S Goodwin
Sec-Treas. Samuel Riker Jr
EMPIRE ZINC DIV, Hanover, undergr, Zn, Pb
Supt: K R Winslow
(See Colo, Ill, NJ, NY, Pa, Tenn, Va, Wisc)

NEW MEXICO QUARTZ MFG CO, INC
1115 4th NW, Albuquerque
Pres: James A McKinnon
VP: Robert I Ludwig
Sec-Treas: W C Oestreich
OROQUAY, SILICA & SANTA ANA MINES, undergr, open pit
Gen Mgr: Robert I Ludwig

NEW MEXICO THORIUM CORP
PO Box 3, Carlsbad
Pres: Lee Downey
PINE MINE, open pit, Th
Gen Mgr: T J Futch

ORE REDUCTION CO
Box 922, Lordsburg
Pres: J E James
3774 Sunset Blvd
Houston, Tex
Clyde Wilkins, Lease mines
SMELTER, 6 mi W Lordsburg
Supt: A C James

OSMER, L L
Silver City
MINE, Grant County, Au, Ag, Cu, Pb, Zn

OZARK-MAHONING CO MNG DIV
310 W Sixth St, Tulsa 19 Okla
MINES, CaF_2
(See Colo, Ill, Okla)

PACIFIC URANIUM MINES INC
1924 White, Grand Junction Colo
Pres: Dr M O Hassialis
VP H E Roberts
Sec-Treas: I Kellogg
SECTION 24 & 26 MINES, Ambrosia Lake dist, undergr U_3O_8
Mgr: R L Redmond
Geol: J H Volgamore, Jr
Co Rep Res Eng: R O'Brien
Prod: 1, 000 tons
(Managed by Kermac Nuclear Corp, Grants)
(See Colo)

PATTEN & GALASSINI
Box 296, Bayard
Part: L A Patten
Gene Galassini
LYNCHBURG & CONTINENTAL "A" MINE, Grant County Pb, Zn, Cu, undergr

PHELPS DODGE CORP
Tyrone
BURRO MT BRANCH
No prod
COPPER & RACKET MINE, Grant County, Cu
No prod
(See Ariz, NY, Tex)

PHILLIPS PETROLEUM CO
CHURCH ROCK MINE, Box 990, Gallup, McKinley County, undergr, U_3O_8
Mine Mgr: R F Moe
Mine Supt: H F Haller
Dist Geol: Dean Clark
ANN LEE, SANDSTONE, ISABELLA & CLIFFSIDE MINES, Box 36, Grants, McKinley County, undergr, U_3O_8
Dist Mgr: A A Ruoho
Asst Dist Mgr-Adm: G E Karr
Supt of Mines: R M Caywood
Maint Supt: C W Gregory
Mine Eng: C E Doney
Dist Geol: D C Arnold
1725-TON MILL, McKinley County
Mill Supt: W O Bice
Process Supt: J W Garner
Tech Supt: J R Owen
Mech Supt: G W Robinson
Ch Met: H L Ford
Ch Chem: W W Hails
(See Okla, Utah)

POTASH CO OF AMERICA
Box 31, Carlsbad
Pres: John W Hall
VP & Res Mgr: H N Clark
Treas: W H Bartlett
Purch Agt: A H Beidel
Ind Rel Supt: B K Lincoln
MINE, 21 mi NE of Carlsbad, undergr KCl_3
Plant Eng: R R Dabney
Safety Eng: P F Holstein
Gen Supt: R R Knill
Mine Supt: David Rice
Mine Eng: E C Jourdan
Prod: 9, 000 tons
8000-TON FLOT MILL, at mine
Mill Supt: R E Smith
Asst Mill Supt: P S Jack

PYRAMID PUMICE CO, INC
1833 A San Mateo, NE Albuquerque
Gen Mgr: A W Kirschner
PYRAMID PUMICE MINE, Jemez Mts N of Domingo, open pit, pumice
600-TON CRUSHING & GRADING MILL, Domingo, pumice

R I P MINING CO
5029 Alps
El Paso, Texas
BONANZA MINE, Otero County, Au, Ag, Cu, Pb, Zn

RAINBOW MNG CO
Box 1087, Willcox, Ariz
CARLISLE MINE, Grant County, Au, Ag, Cu, Pb, Zn

RANCHERS EXPLORATION & DEVEL CORP
4204 Coal Ave, S E Albuquerque,
Pres Ellis Mc Phaul
VP: Adrian Herryhill, Jeff Tietjen
Sec: H C Ringer
Treas Karl Kothman
Asst Sec-Treas Tibo J Chavez
Gen Mgr Harold M Morgan

RARE METALS CORP OF AMERICA
6th Floor, El Paso Natural Gas Bldg, 315 E 2nd, South, Salt Lake City, Utah
Pres: C L Perkins
VP M H Kline
Sec-Treas: Virgil Rittmann
SAN MATEO MINE, Ambrosia Lake dist, Valencia & McKinley counties, undergr, U_3O_8
Mine Supt: J J Snider
(See Ariz, Idaho, Utah)

SABRE-PINON CORP
PO Box 1537, Bokum Bldg Santa Fe
Pres: Richard D Bokum, II
VP W R Montgomery
R P Dodge
Sec W L Leeds
Treas: Hugh M Craigie
BLACK JACK #1 & 2 MINES, Smith Lake, undergr, U_3O_8
Gen Mgr: Wm A Buchecker
Gen Supt: H D Nelson
Mech Eng: Dale Riniker
Prod: 800 tons daily
(Operated by Lance Corp)
MILL
(See Homestake-Sapin Part, N Mex, also Homestake Mng Co, Calif, S Dak, Utah & Wyo)

ST CLOUD MINING CO
Hillsboro
Pres: Roy Chan
VP: Elwood Dietrich
Sec-Treas: Milton Louis
Purch Agt: Charles Coe
ST CLOUD MINE, undergr, Cu, Au
Gen Mgr: Elwood Dietrich
Asst Gen Mgr. Charles Coe
Under devel

SCARTACCINI, TOM B
420 Amherst, NE Albuquerque
SAN PEDRO MINE, Cu, Au, Ag

SEE-TEE MNG CORP
Box 1509, Albuquerque
Pres: W Rodney DeVilliers
VP: Ray Schultze
Sec & Chmn of Bd: Stella Dysart
MESA TOP, BEACON HILL, BUCKEY, CHILL WILLS MINES, Box 508, Grants, undergr, U_3O_8
Gen Mgr: Ray Schultze
Geol: William Bales
Mine Supts: E H Smith
Wm Trout
Ed Scanland
Prod: 300 tons combined

SIERRA MINERALS & MNG COMPANY
602 Juniper, Truth or Consequences, N Mex
Gen Mgr: Burrell Rogers
BECKY, DELIGHT & VINDICATOR MINES, Sierra county, Au, Ag, Cu, Pb, Zn

SOCORRO URANIUM CORP
210 C A Johnson Bldg Denver, Colo
JETER MINE, Socorro Co, open pit, U_3O_8
Mine Supt: Ray A Bennett

SOUTHWEST POTASH CORP (SUBSID OF AMERICAN METAL CLIMAX, INC)
1270 Ave of the Americas New York 20, New York

Pres: Thomas W Childs
VP: F H Stewart
W Aubrey Smith
Sec: Erwin A Weil
Treas: D J Donahue
VP, Sales: T E Camp
MINE, PO Box 472, Carlsbad
26 mi NE of Carlsbad, undergr, potash
Gen Mgr: Victor A Zandon
Gen Supt: John Sowers
Mech Engr: J M Macintyre
Met: Charles Abernathy
Purch Agt: E W Brooks
Mine Supt: Lloyd Foulkes
Mine Frm: T Van Curen
Mine Eng: Ira Herbert
Prod: 7,500 tons
5,000-TON FLOT MILL, Carlsbad
Mill Supt: J Stanley Mitchell
Mill Frm: A Richardson
(See American Metal Climax, Inc, NY)

STAR MINES
602 W 12th St, Silver City
Pres & Gen Mgr: David D Osmer
MORNING STAR MINE, undergr, placer, WO_3, Bi
Mine Supt: Louis L Osmer, Jr
No Prod
24-TON GRAV MILL, at mine

SUNSHINE MNG CO
Box 733, Socorro
BLANCHARD PROPERTY
MINE, Pb, Ba, fluorite
Project Mgr: E F Elstone
Mgr of Mines: J Edgar
Under devel
(See Idaho, Wash)

LLOYD O SUTTON
Grants
MINE, U_3O_8

TRI-STATE METALS CORP
Box 71, Chester, West Virginia
Pres: Theodore D Glass
VP: Wm E Conklin
Sec-Treas: John G Seanor
GLASS PROPERTY, Taos, Rio
Gen Mgr: Theodore D Glass
Geol: Eugene C Anderson
Under devel

TYCONDA MINERALS CORP
PO Box 343, Albuquerque
Pres: Vernon F Foy
VP: Woodrow W Light
Sec-Treas: Betty V Woods
BUCKEYE & LONE PINE MINES, Cu, U_3O_8, Au, Ag
Gen Mgr: Vernon F Foy
Asst Gen Mgr: Woodrow W Light
Geol: Victor H Zabel
Mech Eng: Reginald B Rochester
Mine Frm: E C Jewell

UNITED PERLITE CORP
PO Box 367, Antonito, Colo
Pres-Treas: Charles Dimit
VP-Sec: William S McKay
Purch Agt: Joseph Becker
MINE, open pit, perlite
Gen Mgr: William S McKay
Gen Supt: Jack Hess
Mine Supt: Ivel Christensen
Prod: 150 tons
150-TON MILL, Taos County
Mill Frm: Benancio Romero

U S BORAX & CHEMICAL CORP
Carlsbad
Res Mgr: Earl H Miller
Asst to Res Mgr: J V Kern
Tech Asst to Res Mgr: H E Foy
Purch Agt: A P Simons
MINE & REFINERY, 21 mi E of Carlsbad, potash
Field Supt: John S Wright
Mine Supt: J C Horne
Refinery Supt: W W Lair
(See Calif, NY)

U S GYPSUM CO
300 W Adams St, Chicago 6, Ill
QUARRY, Grants, open pit, perlite
Works Mgr: B J Wilson
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mich, Mont, Ohio, Okla, NY, Tex, Utah, Va)

U S SMELTING, REFINING & MINING CO
BAYARD DEPT, PO Box 698, Bayard
MINES, Pb, Zn
Supt: G E Cudney
FLOT MILL
Gen Mill Frm: Gordon T Glover
(See Alaska, Ariz, Mass, Utah)

UNITED WESTERN MINERALS CO
302 E Palace Avenue, Santa Fe
Pres-Treas: Leland Thompson, Jr
VP-Sec: E B White, Jr
SEC 32, T-14N, R-9W, Ambrosia Lake, undergr, U_3O_8
Prod: 250 tons
(This section is dedicated to Homestake-New Mexico Partners)
SEC 22, T-14N, R-10W, Ambrosia Lake, undergr, U_3O_8
Prod: 1,000 tons
Ops, Kermac Nuclear Fuels, Inc
(Jointly owned by Kerr-McGee Oil Ind, United Western Minerals Co, J H Whitney & Co, White Weld & Co, San Jacinto Petrol Corp)
SEC 14, T-13 N, R-9 W, Ambrosia Lake, undergr, U_3O_8
Prod: 300 tons
Op: Four Corners Explor Co
(Jointly owned by Four Corners Explor Co, United Western Minerals Co, J H Whitney & Co, San Jacinto Petrol Corp)
SEC 36, T-14 N, R-10 W, Ambrosia Lake, undergr, U_3O_8
SEC 28, (E1/2) T-14 N, R-10 W, Ambrosia Lake, undergr, U_3O_8
Drilled out ore body of undetermined tonnage
Op: Phillips Petrol
(Jointly owned by Phillips Petrol, United Western Minerals Co, et al)
750-TON CARBONATE LEACH PLANT, near Grants
(Jointly owned by Homestake New Mexico Partners)
Gen Supt: Clyde Osborn

UTAH STANDARD PROSPECT MINE
Box 43, Ancho
MINE, Undergr Au, Ag, Cu
Under devel
Under devel

VIA DEVELOPMENT CORP
Box 4266, Santa Fe
Pres: Clarence W Via
VP: H H Via
Sec-Treas: W Dale Trieder
(See Ariz)

VOGEL MINING & EXPLORATION CO
PO Box 3183, Amarillo, Texas
Gen Mgr: Harold W Vogel
Asst Mgr: Harold H Ham
HILL MINES NO 1 & 2, Red River mng dist, Questa, undergr, Zn, Pb, Au, Ag, Mo, pollucite
Under devel

W & M MINING CO
Gen Del, Winston
Person in Charge: Pete McDonald
Gen Mgr: Ken Wittie
Gen Supt: Donald G Fingado
BLACK HAWK MINE, Ag, Cu

WERNER LAKE NICKEL MINES, LTD
311-200 Bay St, Toronto, Ontario, Canada
Pres: R C C Henson
VP: G D Clarke
Sec-Treas: G E Kennedy
HENRY CLAY MINE, PO Box 546, Lordsburg, undergr, Cu, Au, Ag
Gen Mgr: Murray Watts
(Under sublease to Brannan & Fuller, Silver City)

WESTERN SMELTING & REFINING CO
Route 1, Box 1524, Clark Rd, Albuquerque
Pres: C Taylor
Gen Mgr: P Taylor
BELVIDERE MINE, Cu, Au, Pt
Under devel

WHITE STAR MINES
Box 565, Columbus
MINE
Mine Supt: Boyce Cook

WILLIAMS' MNG PARTNERSHIP
Uranium Center Bldg, Grand Junction, Colo
BARBARA J #3 MINE, Grants, U_3O_8
Prod: 100 tons
(Leased from Mid-Continent Uranium Corp. See Colo)

WRIGHT, DONALD W
523 3rd St, NW
Albuquerque
SEC 19 14N 11 W MINE, McKinley County, U_3O_8

ZUNIGA MINES, INC
Box 601, Silver City
Pres: Douglas B White
VP: Earl Strong
Sec-Treas: Frank Light
ZUNIGA MINE, near Fierro, Grant County, surface; Cu
Prod: 100 tons
LEACHING MILL, at mine

NEW YORK

ALLIED CHEM CORP (Mng Dept)
40 Rector St, New York 6
Pres: F J French
VP: J S Brown
Purch Agt: J A Simpson
Mgr, Mng Oper: W J Trepp
Asst Mgr, Mng Oper: J R Pennington
Geol: H E Puttuck
(See Colo, NJ, Va)

AMERICAN AGRI CHEM CO, THE
100 Church St, New York 7
Pres: C M Powell
VP: R B Richey
VP, Prod: D S Parkham
VP, Fert Sales: W S Turberville, Jr
VP, Chem Sales: F R George
Sec-Treas: Hughes Mayo
Comptroller: W H Hildebrandt
Purch Agt: L E Engle
(See Fla)

AMERICAN CYANAMID CO
Agricultural Division
30 Rockefeller Plaza
New York 20,
Pres: Dr W G Malcolm
Exec VP: K H Klipstein
VP: G W Russell
Sec: R S Kyle
Treas: G C Walker
Dir of Purch: K H LaRowe
Gen Mgr, Agric Div: C D Siverd
(See Ark, Fla, Ga, Va)

AMERICAN METAL CLIMAX, INC
1270 Ave of the Americas
New York 20,
Chmn of Bd: Arthur H Bunker
Pres: Frank Coolbaugh
VP: T W Childs, H S Cohen, H de Neufville, A J Herzig, Ian K MacGregor, J Payne, Jr, E T Rose, Jean Vuillequez, R E Warriner
Sec: Erwin A Weil
Treas: Donald J Donahue
Pres, Climax Molybdenum Co: Wallace MacGregor
(See Colo, U S Metals Ref Co, NJ, Southwest Potash Corp, N Mex, NY, Climax Molybdenum Co, Colo)

AMERICAN SMELTING & REFINING CO
120 Broadway, New York 5
Chmn of Bd, Pres: J D MacKenzie
Vice Chmn of Bd: R W Vaughan
Exec VP: R D Bradford, E McL Tittman
VP: S D Strauss, A J Phillips, A A Brown, F H Eichler, R L Jourdan, C F Barber, W J Nock
VP-Treas: F G Hamrick
Sec: Harold Howe
Ore Purch Dept: R L Jourdan
MNG DEPT
Asst to VP, D J Pope
Res Eng: V I Mann, C E Nelson, J G Pearcey
Explor Mgr, C P Pollock
Gen Traffic Mgr: F L Merwin
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, Neb, NJ, New Mexico, Tex, Utah, Wash)

ANACONDA CO, THE
25 Broadway, New York
Chmn of Bd: C E Weed
Exec VP: E S McGlone
Exec VP & Gen Counsel: C J Parkinson
VP, Chg of Oper: R S Newlin
VP, Chg Latin Amer Affairs: T A Campbell
VP: E I Renouard, John A Coe
Compt: W E Quigley
VP & Ch Geol: V D Perry
Sec-Treas: R E Schneider
Asst Compt: D R Nelson & R L Cooney
Asst Sec-Treas: T E Tatem, W J Fogerty, E Mayo, J J Cinaglia, F M Byrnes
(See Calif, Idaho, Mont, Nev, N Mex)

BARTON MINES CORP
North Creek, Warren County
Pres: H H Barton
VP: C J Lewis
Sec-Treas: J B Burns
Mgr, T J Leonard
MINE, near North Creek, open pit, garnet
Plant Mgr: Wm Elting
400-TON FLOT-HEAV-MED MILL, at mine

BEAR CREEK MNG CO
161 E 42nd St, New York 17
(See Utah & Kennecott Copper Corp, Ariz, NY, Utah)

BON AMI MNG CO, INC
445 Park Ave, New York 22
(See New Hampshire)

CABOT CORPORATION
Willsboro
MINE, Essex County, undergr, wollastonite
Gen Mgr: Lauren W Choate
Plant Eng: James T Lynch
Mine Supt: Roy C Rodenhiser
Mine Frm: Philip R Redmond, Carl Dittrich
400-TON MILL
Mill Supt: Vito R Marchione
Maint Frm: Raymond L Mero

CALLAHAN MNG CORP
100 Park Ave, New York 17
Pres, J T Hall
VP: R F Mahoney, P D Wilson
Sec-Treas: E A Salo
(See Idaho)

CALUMET & HECLA, INC
60 E 42nd St, New York
Pres: Paul Dashine
(See Ill, Mich, N Mex)

CARBOLA CHEMICAL CO, INC
Natural Bridge
Pres: H T Koenig
Sec-Treas: P V Clonan
Tech Dir: Norman R Bonner
Purch Agt: W C Redmond
Prod Mgr: F L Beggs

MINE, Talcose limestone
Mine Supt: L D Smith
Prod: 100 tons
MILL, at mine
Mill Supt: D L Donaghy
Specialty: S McIntyre
Prod: 100 tons

CLIMAX URANIUM CO (Subsid of AMERICAN METAL CLIMAX, INC)
500 Fifth Ave, New York 36
Pres: Frank Coolbaugh
(See Ariz, Colo, Utah)

CLINTON METALLIC PAINT CO
Clinton
Pres & Treas: F L MacDonald
Sec & Purch Agr: C K Covell
CLINTON MINE NO3, Clinton, undergr, iron oxide
Mine Supt: Robert Barry
Prod: 40 tons
40-TON CRUSHER, HAMMER-BALL MILL, Franklin Springs
Mill Supt: Robert Barry

CYPRUS MINES CORP CORP
60 East 56th St, New York 22,
Pres: H T Mudd
VP: A R Thomas
VP & Treas: H S Nye
Sec: L A Garrett
Purch Agt: W F Stover
(See Ariz, Calif, Colo)

DAWN MNG CO
300 Park Avenue, New York
(See Wash)

FREEPORT NICKEL CO
161 E 42nd St, New York 17
Pres: R C Hills
VP-Sales: C J Brown
VP-Sec: H L Pierson
(See La)

FREEPORT SULPHUR CO
161 E 42nd St, New York 17
Pres: C A Wight
Chmn Exec Comm, P E Neaman
Exec VP: R C Hills, R C Wells
VP & Sec: H L Pierson
VP Pub Rel: J C Carrington
(See La, & Nat'l Potash Co, NY, N Mex)

GOLD FIELDS MNG & INDUSTRIAL LTD
123 William St, New York 38
Exec VP: R F Playter
VP-Mng: V C Allen
VP-Finance: J H Nicholls

GOUVERNEUR TALC CO, INC
c/o R T Vanderbilt Co
230 Park Avenue, New York 17,
Pres: F B Vanderbilt
Sec, H B Vanderbilt
Treas: F C Gens
Purch Agt: K J Miles
VANDERBILT MINE, Balmat, undergr, talc
VP & Gen Mgr: R S McClellan
Mine Supt: J Bulgar
Frm: Leon Typhair
Mine Eng: George Erdman
Prod: 400 tons
500-TON DRY GRIND PLANT
Mill Supt: Howard Adam

HOWE SOUND CO
500 Fifth Ave, New York 36,
Pres: W M Weaver, Jr
VP, Mng: F A McGonigle
VP, Finance: W T Holmes
VP, Marketing, T T Fleming
Sec, C R Skinker
Treas, J F Wilmott
Purch Agt: Anne D Repko
(See Manganese, Inc, Nev)

IDARADO MNG CO
300 Park Avenue New York 22,
Chmn of Bd and Dir: Oscar H Johnson
Pres & Dir: M D Banghart
VP & Dir: P Malozemoff
Sec & Dir: John E D Grunow
Treas & Dir: Walter P Schmid
Dir: Robert B Fulton, G Spencer Hinsdale, H B Van Sinderen, John S Wise
Asst Sec: Jacques L Leroy

Asst Treas: Wm F Richards, Jr
Mine Office: Ouray, Colo
(See Colo)

J M HUBER CORP
630 - 3rd Avenue
New York 17,
MINE & PLANT, Ga
(See Ga)

INDUSTRIES & MINES INC
50 Broad St, New York 4
Pres-Purch Agt:
Martin Lasher
VP: William Scott
Sec: P V Frankel
Treas: M Grossman
(See Utah)

INSPIRATION CONSOL COPPER CO
25 Broadway, New York 4
Pres: H M Jacob
VP: H Carroll Weed
Sec-Treas: E F Wendt
Purch Agt: A B Harris
(See Ariz)

INTERNATIONAL SALT CO
Clarks Summit, Pa
Pres: Edward L Fuller
VP: John L Ryon
Sec: Hervey J Osborn
Treas: Mortimer B Fuller, Jr
Purch Agt: Louis H Healy
RETSOF MINE, Retsof, 4 mi S of Geneseo, undergr, rock salt
Gen Mgr: Stanley Martin
Asst Gen Mgr: W Bradley Root
Gen Supt: Laurence C Teter
Geol: Chester Truax
Mech Eng: Guy J Mustari
Plant Eng: Reuben G Goetz
Asst Mine Supt: Arthur D McCaughey
Mine Frm: William McAllister
Prod: 5,000 tons

INTERNATIONAL SMELTING & REFINING CO
25 Broadway, New York
(See NJ, Utah)

INTERNATIONAL TALC CO, INC
Box 200, Gouverneur
Pres: R H McCarthy
VP: T W Rourke
P F McCarthy
Purch Agt: A P Loomis
INTERNATIONAL MINE, Gouverneur, talc
VP-Gen Mgr: F G Kuehl
Mine Supt: David Crawford
Asst Mine Supt: Peter Rocco
Mill Supt: C F Dievendorf
Prod: 482 tons

JOHNS-MANVILLE PRODUCTS CORP
22 E 40th St, New York 16
Pres: C B Burnett
VP: K W Huffine
Sec: H M Ball
Treas: J M Shackelfordd
Purch Agt: D H Lyons
(See Calif)

JONES & LAUGHLIN STEEL CORP, NEW YORK ORE DIVISION
Star Lake
BENSON MINES, 32 mi E of Gouverneur, open pit, Fe
Mgr: R G Fleck
Asst Mgr: A F Peterson, Jr
M O Peterson
Ch Mng Eng: E M Smeby
Met: Frank P Howald
Ree Eng: Carl Djuvik
Ch Acct: A R Eshbach
Geol: F J West
Ind Eng: C N Gilmore
Gen Frm, Pit: W P Bach
Gen Grm, Conc: W A Vickers
Gen Frm, Sinter: R W West
Gen Frm, Maint: P L VerSteeg
Ch Elec: R F Peterson
Safety Supt: C LaDuc
Prod: 15,000 tons crude
5,000 tons concen
GRAV & MAGNETIC SEPARATOR MILL, at mine
SINTER PLANT, at mine
(See Mich, Minn, Pa)

KENNECOTT COPPER CORP
161 E 42nd St,
New York 17,
Pres: C R Cox
Exec VP: F R Milliken
VP, Explor: G H Burgess
(Bear Creek Mng Co)
VP, Research:
Leslie G Jenness
Sec: Paul B Jessup
Treas: James R Simpson
Compt: G B Russell
Dir, Eng: M D Ayers
Ind Rel Counsel:
A S Cheroury
Gen Counsel:
Robert H Lounsbury
Gen Purch Agt:
L W Shelton
Gen Traffic Mgr:
R E Taylor
(See Nev, N Mex, Utah and Bear Creek Mng Co, NY, Utah)

LITHIUM CORP OF AMERICA, INC
500 Fifth Avenue,
New York, 36,
Pres & Treas:
Harry D Feltenstein, Jr
VP, Mng & Mfg:
Fremont Clarke
Sec: Robert E Bowman
(See NC)

MOLYBDENUM CORP OF AMERICA
375 Park Avenue
New York 22,
Pres: Max Hirsch
Exec VP: Emil A Lucas
Sec: James S Crawford
Treas: William B Kuntz
(See Calif, Colo, N Mex, Pa)

NATIONAL GYPSUM CO
325 Delaware Ave,
Buffalo 2
Pres: F A Manske
VP, Oper: L L Hank
VP, Mfg: E W Odenwaldt
MINE, Clarence Center, undergr, gypsum
Plant Mgr: E J Killian
Mine Supt: L D Liles
Prod: 1,000 tons
MILL, at mine
(See Ariz, Ind, Iowa, Kans, Mich, Tex, Pa, Va)

NATIONAL LEAD CO
111 Broadway, New York 6
Pres: Joseph A Martino
VP: Alfred H Drewes
Frank J Koegler
David A Merson
Joseph H Reid
Wm J Welch
George B Coale
Sec: John B Henrich
Treas: Joseph J Morsman, Jr
Mgr, Mng Dept: G M Wiles
TITANIUM DIV, MACINTYRE DEVEL, Tahawus, open pit, ilmenite, magnetite
Plant Mgr: John G Hall
Asst Plant Mgr: C R Begor, Jr
B Dellinger
Geol: S O Gross
Ch Eng: R I Kingman
Mine Supt: W M Chapman
FLOT-GRAV-MAGNETIC SINTER PLANT, Tahawus
(See Ark, Calif, Colo, La, Mo, Mont, Tenn, Tex, Utah, Wyo)

NATIONAL POTASH CO
161 E 42nd St, New York 17
Chmn of Bd: R C Wells
Pres: T G Ferguson
VP: W B Porterfield
Sec-Treas: A F Rothwell
Purch Agt: J A Browell
(See N Mex)

NEW JERSEY ZINC CO, THE
160 Front St, New York 38
Pres: R L McCann
VP, Mng & Explor:
S S Goodwin
Sec-Treas: Samuel Riker, Jr
Mgr-Mines: W T Pettijohn
Asst Mgr Mines: Al Hayes
Johnson Crawford
(See Colo, Ill, NJ, N Mex, Pa, Tenn, Va, Wisc)

NEW YORK & HONDURAS ROSARIO MNG COMPANY
120 Broadway
New York 5,
Pres: R M Reininger
VP: H I Altshuler
H S Anderson
Treas-Sec: G E McDaniel
Purch Agt: W Di Vergilio

PACIFIC TIN CONSOL CORP
120 Broadway, New York
(See subsidiary, Feldspar Corp, Conn, Ga, NC, Tenn)

PHELPS DODGE CORP
300 Park Avenue
New York 22,
Pres: Robert G Page
VP: Cleveland E Dodge
VP & Compt: J Mills Hawkins
VP & Gen Mgr, Western Oper: Walter C Lawson
Asst VP & Sec: John E Master
Asst to Pres: Warren E Fenzi
George B Munroe
Asst Compt: J Milton Gilkes, Arthur F Petersen
Treas & Asst Sec:
Martin W Urquhart
Asst Sec-Treas: Harold R Dobbs
Robert D Barnhart
Mgr, Explor: Herbert Z Stuart
Sales Mgr: Charles H Winship, Jr
Gen Purch Agt:
Frederick A Scheffler
Asst Gen Purch Agt:
Robert P Ziegert
Gen Traff Mgr:
Bernard Ponessa
Asst Gen Traff Mgr:
Harry Wright
(See Ariz, N Mex, & Phelps Dodge Ref Corp, NY & Tex)

PHELPS DODGE REF CORP (SUBSID OF PHELPS DODGE CORP)
300 Park Ave,
New York 22,
Pres: Carleton S Harloff
VP: H Barkell
C H Winship, Jr
C E Dodge
Sec: John E Masten
Treas: M W Urquhart
Purch Agt: F A Scheffler
Gen Traff Mgr:
Bernard Ponessa
(See Tex & Phelps Dodge Corp, Ariz, N Mex, NY)

PINNACLE EXPLOR INC
100 Park Ave,
New York 17,
Pres: Philip D Wilson
VP: Joseph T Hall
Sec: Arthur Salo
Treas: R F Micari
PITCH MINE, Gunnison, Colo
(See Colo)

REPUBLIC STEEL CORP
Republic Bldg,
Cleveland 1, Ohio
Pres: T F Patton
VP, Oper: H L Allen
Sec: W B Belden
Treas: W B Boyer
Purch Agt: W T Adams
OLD BED, HARMONY & FISHER HILL MINES, Mineville, undergr, magnetite
Mgr: W A Blomstran
Mine Supt: J R Murphy
Asst Mine Supt:
P F Farrell
Eng: A F Hughes
Prod: 6,000 tons
MILL, magnetic, Moriah
Prod: 3,000 tons
Supt: J R Scott
CHATEAUGAY MINE, Lyon Mt, undergr & surface, magnetite
Mgr: W G Crusberg
Supt: Joseph Tolosky, Sr
Ch Eng: A K McClellan, Jr
Gen Supt: E D Knox
Prod: 1,250,000 tons per year
CHATEAUGAY MILL, magnetic
Supt: J R Tolosky, Jr
Prod: 3,000 tons conc
SINTERING PLANT: Lyon Mt,
Supt: J Kelley
Prod: 385,000 tons
(See Ala, Mich, Minn, Ohio)

THE RUBEROID COMPANY
500 Fifth Ave
New York
Pres: E J O'Leary
Sec: O A Maggia
Treas: G F Bahrs
Purch Agt: K R MacDonald
RUBEROID MINE, Wheatland, undergr, gypsum
Gen Mgr: J K Stewart
Asst Gen Mgr: F Foster
Prod: 500 tons
MILL, Wheatland
(See Vt)

ST JOSEPH LEAD CO
250 Park Avenue
New York 17
Chmn of Bd:
Andrew Fletcher
Pres: Francis Cameron
VP-Sales Mgr:
Charles R Ince
VP: Robert Ramsey
C Merrill Chapin, Jr
Lawrason Riggs III
Treas: James G Colvin
Sec: Donold K Lourie
Asst Sec: William J Elliott
Asst Treas: Edward P Merrell
Comptroller:
William L Murphy, Jr
EDWARDS-BALMAT MINES, Balmat, St Lawrence Co, undergr, Zn, Pb
Mgr: Marshall G Jones
Asst Mgr: Mark Riley
Mill Supt: Malcolm Lowry
Mine Supt: Jules LaPrairie
Mast Mech: Marshall Phelps
(See Mo, Pa)

SHANMOON INDUSTRIES INC
55 Liberty St
New York 5,
(See NJ)

SHATTUCK DENN MNG CORP
120 Broadway
New York 5,
Pres: Thomas Bardon
Exec VP: Willard J LaMorte
VP: Thomas V Tozzi
Asst VP: T W Newell
D M Kentro
Sec-Treas: John A Moss
(See Ariz, Colo, Utah)

SOUTHERN CLAYS INC
33 Rector St
New York 6,
PLANT, Ga
(See Ga)

SOUTHWEST POTASH CORP (Subsid of AMERICAN METAL CLIMAX, INC)
1270 Ave of the Americas
New York 20,
Pres: T W Childs
VP: John Payne, Jr
T G Moore
Thomas E Camp, Jr
F H Stewart,
Jean Vuillequez
Sec: E A Weil
Treas: Hans A Vogelstein
Cont: Herbert S Cohen
(See N Mex)

TEXAS GULF SULPHUR CO
75 E 45th St,
New York 17,
Chmn: Fred M Nelson
Pres: Claude O Stephens
VP & Treas: E C Meaghet
VP & Sec:
E F VanderStucken, Jr
VP & Mgr Explor:
C P Fogarty
VP & Mgr Sales: A N Myers
VP & Mgr Research:
G T McBride
Cont & Asst Treas:
L H Gravier
Asst Treas:
T P Townsend,
G N McKee, Jr
Asst Cont: W F Meyer
(See Tex, Utah)

TRI-STATE ZINC, INC
123 William St,
New York 38,
Pres: R F Playter
VP: V C Allen
Sec-Treas: J H Nicholls
(See Ill, Va)

TROUT MNG CO
233 Broadway
New York 7
Pres: Chas A R Lambly
Sec: R G Burns
Treas: G A Swennumson
(See Mont)

TUNGSTEN MNG CORP
500 Fifth Ave
New York 36,
Pres: W M Weaver, Jr
VP, Mng: F A McGonigle
VP, Finance: W T Holmes
VP, Mktg: T T Fleming
Sec: C R Skinker
Treas: J F Wilmott
Purch Agt: Anne D Repko
(See NC)

UNION CARBIDE NUCLEAR CO, DIV OF UNION CARBIDE CORP
270 Park Avenue
New York 17,
Pres: Lyman A Bliss
VP: Clark E Center
S J Cromer
A Q Lundquist
W M Smart,
C O Strother
(See Calif, Colo, Nev, Utah, Wyo)

U S BORAX & CHEMICAL CORP
30 Rockefeller Plaza
New York,
(See Calif, N Mex)

U S GYPSUM CO
300 W Adams St,
Chicago 6, Ill
MINE, Oakfield, undergr, gypsum
Works Mgr: W E Allen
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mich, Mont, Ohio, Okla, N Mex, Tex, Utah, Va)

VANADIUM CORP OF AMERICA
420 Lexington Avenue
New York 17
Chmn of Bd: W C Keeley
Pres: G L Weissenburger
Sec: D A Shriver
Purch Agt: F W Thomas
Treas: L C Miller
(See Ariz, Colo)

VITRO MINERALS CORP (SUBSID OF VITRO CORP OF AMERICA & ROCHESTER & PITTSBURGH COAL CO)
261 Madison Avenue
New York 16
Pres: C J Potter
Exec VP: E B Hotchkiss
Sec: W H Denne, Jr
Treas: R T Ruder
(See Utah, Wyo)

WESTERN GOLD & URANIUM, INC
42 Broadway
New York 4
Chmn of Bd: Richard Ince
VP: Dave Shirra
Sec: Berene B Porter
Treas: J L Fakler
(See Ariz, Colo, Utah)

NORTH CAROLINA

ABERNATHY MNG CO
Route 2, Spruce Pine
Part: J C Wilson
ABERNATHY MINE & SHEETING HOUSE, Mitchell County, undergr, mica

APPALACHIAN SULPHIDES, INC
1107-55 Yonge St,
Toronto 1, Ontario, Canada
Pres: E R E Carter
VP: R P Mills
Sec: G Gutierrez
Treas: G C Andrew
ORE KNOB MINE, Jefferson undergr, Cu
Mine Mgr: L P Eckman
Prod: 800 tons
800-TON FLOT MILL, Ashe County
Mill Supt: S J Nameth

BOLINGER, H E, DR
Box 276, Marshall
Oper: Dr H E Bolinger
MOOREHEAD MINE, STACKHOUSE MINE, Marshall Madison County, undergr, barite
No Prod

BOREN & HARVEY
Pumona
Snow Camp Mine, Alamance County, pyrophyllite

CAROLINA PYROPHYLLITE CO GLENDON DIVISION
PO Box 2414, Greensboro
Pres: John E Boyd
VP: W B Boyd
Sec: R E Burdick
Treas: E A Scott
Purch Agt: W F Poad
MINE, open pit, pyrophyllite, MILL

CAROLINA-SOUTHERN MNG CO, INC
Box 9, Kingsport, Tenn
Pres: C P Edwards, III
VP & Purch Agt: J T Blanchard
Sec: Elizabeth Powell
Treas: Wanda B Hammett
30-TON FLOT MILL, Boonford, mica
Mill Supt: Clarence Edge
Mill Frm: Guy Boone
SMELTER, Boonford
Supt: Clarence Edge
(See Tenn)

CLINCHFIELD SAND & FELDSPAR CO
413 Washington Ave
Baltimore, Md
MINE, Davie Co, feldspar
No Prod
(See Md)

CRANBERRY MAGNETITE CORP
Box 266, Cranberry
CRANBERRY MINE, Avery County, undergr, Fe
Mine Supt: N T Dixon

DIAMOND MICA CO
Spruce Pine
Mgr: R T Dent, Jr
SPRUCE PINE PLANT, Mitchell County, Mica

ENGLISH MICA CO
Spruce Pine
PLANT #1, 43, mica
Supt: Ray Gunter

FELDSPAR CORP, THE
PO Box 220, Spruce Pine
Pres: N Cleveland
VP: F S Miller
C P Rogers, Jr
Sec-Treas: G N Blevins
Engr: I L McMurray
MINE, open pit, feldspar
Gen Mgr: C Rogers, Jr
Asst Gen Mgr: P C Coletta
Supt: Ralph Hughes
Frm: Robert Boone
FLOT MILL, at mine
Gen Supt: R W Hughes
Supt: Carl Burleson
DRY GRINDING MILL, Burnesville
Supt: P C Coletta
Cap: 1,000 tons
(Subsid of Pacific Tin Consol Corp, NY)
(See Ga, Tenn, Conn)

FOOTE MINERAL CO
18 W Chelten Avenue
Philadelphia 44, Pa
Pres: L G Bliss
VP, Prod: F B Shay
VP-Mktg: J S Gates
Sec-Treas: W R Spofford
Purch Agt: W J Brooking
KINGS MT OPERATIONS, PO Box 792, Kings Mt; mine on Grover Rd, Kings Mt, open pit, spodumene, mica, feldspar, commercial stone
Oper Mgr: N O Johnson
Gen Supt: E R Goter
Geol: T L Kesler
Plant Eng: H M Broadwater
Process Eng: R E Mauney
Mine Supt: R C Flow
Mine Frm: L L Day
FLOT MILL, Kings Mt
Mill Supt: W E Horst
Mill Frm: T W Gordon
Assay: S K Peeler
(See Pa, NH, Tenn, Va)

FRANKLIN MINERAL PRODUCTS COMPANY
Franklin
Mgr: Clyde Clark
MICA PLANT, Macon Co, mica

HARBISON-WALKER REFRACTORIES CO
1800 Farmers Bank Bldg, Pittsburgh 22, Pa
Pres: E A Garber
VP: P C Mitchell
Sec: G F Cronmiller
Treas: L E Mock
Purch Agt: R P Snyder
ADDIE MINE, Addie, open pit, olivene
Gen Supt: Harry Henry
(See Ala, Pa)

HITCHCOCK CORP
Murphy
Treas: F C Bourne, Jr
NANCY JORDAN MINES, 2, 3 & PLANT, Cherokee County, undergr, pyrophyllite, talc

INTERNATIONAL MINERALS & CHEM CORP
5401 Old Orchard Rd, Skokie, Ill
MINE, Kona, open pit, feldspar, mica
Gen Supt: L W Breeman, Jr
Asst Gen Supt: Robah Thomas
Mine Supt: C Buchanan
Gen Frm: Clyde Brinkley
MINE, Spruce Pine, open pit, feldspar, mica
Gen Supt: Charles Hickey
Asst Gen Supt: Claude Thomas
Mine Supt: C Stamey
FLOT PLANTS, at mines
(See Ariz, Ill, Fla, Maine, Miss, N Mex, SD, Tenn, Va, Wyo)

KINGS MOUNTAIN MICA CO, INC
Box 709, Kings Mt
Pres: James B Preston, Jr
VP: Herschel E Cole
Treas: Roy H Gunter
Sec-Gen Mgr: Paul A Lancaster
PATTERSON MINE, 2 mi NW of Kings Mt, surface, mica
Prod: 400 tons
400-TON MILL, at mine
Mill Supt: James E White
MOSS MINE, 4 mi SW of Kings Mt, surface, mica
#3
Mill Supt: Marvin Lancaster
Ore Dressing Engr: Hugh A Lancaster

LAWSON-UNITED FELDSPAR & MINERAL COMPANY
Minpro Sta, Spruce Pine
Pres & Gen Mgr: T T Lawson
VP: Branch Lawson
Sec-Treas: C D Lawson
MINE, Minpro Sta, open pit, feldspar, mica
FLOT & DRY GRINDING MILL, at mine

LITHIUM CORP OF AMERICA
500 Fifth Ave,
New York 36, New York
Pres: Harry D Feltenstein, Jr
VP-Mng: Fremont F Clarke
Sec: Robert E Bowman
BESSEMER CITY MINE, Bessemer City, open pit, lithium compounds from spodumene
Mines Mgr: Joseph N McClure
CHEMICAL PLANT, Bessemer City
Res Mgr: J D Herman
(See NY)

MAINE MICA CO
Spruce Pine
MINE, Maine
MILL, Spruce Pine, plate mica
(See Maine)

MINERAL & METALS CORP
Murphy
Sec: F C Bourne, Jr
MULBERRY GAP PLANT & MINE, Cherokee County, undergr, pyrophyllite, talc

MOUNTAIN MNG CO
Spruce Pine
Part: M E Burleson
JIMMY CUT MINE, Mitchell County, undergr, mica

P & H MNG CO
Route 3, Spruce Pine
Part: S L Phillips
GUDGER MINE, Spruce Pine, Mitchell County, undergr, mica

PACIFIC TIN CONSOL CORP
(See The Feldspar Corp, NC & NY)

POWHATTAN MNG CO
6721 Windsor Mill Rd
Baltimore 7, Md
KILPATRICK MINE, Transylvania Co, asbestos
No Prod
HOGBACK MT MINE, Jackson County, asbestos
(See Md)

SINK HOLE MNG CO
Route 3, Bakersville
Part: C W Ellis
SINK HOLE MINES 1 & 2
Mitchell County, undergr, mica

SOUTHERN MICA CO OF NORTH CAROLINA INC
Box 9, Kingsport, Tenn
Pres: C P Edwards, III
VP: J T Blanchard
Sec: Elizabeth Powell
Treas: Wanda B Hammett
Purch Agt: John T Blanchard
PENLAND-BAILEY MINE, open pit, mica
Gen Mgr: J T Blanchard
Asst Gen Mgr & Gen Supt: George W Edge
Prod: 30 tons
FLOT MILL, Penland
(See Tenn)

SOUTHERN PRODUCTS & SILICA CO, INC
Lilesville
MILL, silica

STANDARD MINERAL CO
Robbins
Pres: F B Vanderbilt
VP: H B Vanderbilt
Sec: Fred Chappell
Treas: F C Gens
Purch Agt: W J Woodward
MINE, undergr, open pit, pyrophyllite
Gen Mgr: Fred Chappell
Asst Gen Mgr: Ray Harris
Mine Frm: Cecil Horner
Prod: 65,000 tons yrly
FINE GRINDING MILL, at mine
Mill Frm: H I McLaurin
Cap: 75,000 tons yrly

TENNESSEE COPPER CO
Ducktown, Tenn
SILVER HILL MINE, Davidson County, undergr, Pb, Zn
Under devel
(See Tenn)

TUNGSTEN MNG CORP (SUBSID OF HOWE SOUND CO)
Star Route #36130
Henderson
Pres: Wm M Weaver, Jr
VP: F A McGonigle
Sec: C R Skinker
Treas: J F Wilmot
HAMME MINE, Henderson, undergr, tungsten & synthetic scheelite
VP & Gen Mgr: W L Kendrick
Office Mgr: G B Deacon
Mech & Elec Supt: R C Frith
Purch Agt: R E Smith
Ch Engr: A M Szynklewski
Mine Supt: J B Malcolm
Asst Mine Supt: J W Aker
Prod: 1,100 tons
950-TON FLOT-GRAV MILL, at mine, chem PH & magnetic separation
Mill Supt: N R Stewart
Mill Frm: R L Angel
Assay: S B Adams
(See NY, Howe Sound Co, NY)

UNION REFINING & MNG COMPANY
Box 1247, High Point
Pres & Purch Agt: H A Knight, Sr
VP: R Glenn Hendrix
Sec-Treas: H A Knight, Jr
STAR MINE, Montgomery County, undergr, Au, Ag, telluride
Prod: 150 tons
Under devel
100-TON CYANIDE MILL, Waxhaw
Assay: Gilbert Hendrix

DAVID T VANCE MICA CO, INC
Plumtree
GRINDING PLANT, mica
Mgr: F T Vance

OHIO

ALPHA PORTLAND CEMENT CO
15 S 3rd St
Easton, Pa
IRONTON MINE, Ironton, undergr, limestone

AMERICAN ZINC OXIDE CO (Subsid of AMERICAN ZINC, LEAD & SMELT CO)
1515 Paul Brown Bldg
St Louis 1, Mo
REFINERY, Columbus, Western or tunnel type furnaces
Plant Supt: R H Covington
Plant Mgr: H H Black
output: 21,000 tons zinc oxide yrly
(See Ariz, Ill, Mo, Okla, Tenn, Tex, Wash, Wisc, Utah, N Mex)

BASIC INCORPORATED
845 Hanna Bldg
Cleveland 15,
Pres & Treas: H P Eells, Jr
Sr VP: H C Lee
Sec: W A Melville
Purch Agt: G H Rutherford
MAPLE GROVE QUARRY & PLANT, Fostoria; Maple Grove, Seneca County, surface, dolomite
Works Mgr: A M Caito
(See Nev)

BUTLER BROS (M A HANNA CO, agents)
1300 Leader Bldg,
Cleveland 14,
Chmn of Bd: Patrick Butler
Pres: W A Marting
VP: R W Whitney
W P Weber
Sec: S L Engel
Treas: R E Beal
Asst Sec: F W Bennett
Asst Treas: F C Teske
(See Minn)

CHAMPION PAPER & FIBRE COMPANY
601 N B St, Hamilton
MINE & PLANT, kaolin, Sandersville, Ga
(See Ga)

THE CLEVELAND-CLIFFS IRON CO
14th Floor, Union Commerce Bldg, Cleveland 14,
Chmn of Bd: W A Sterling
Pres: H S Harrison
VP: D R Forrest
VP, Ore Sales & Marine: J S Wilbur
VP, Mng: J S Westwater
VP, Foreign Op & Ore Research: H J Leach (Minn)
Sec: R M Kimmel
Treas: J P Long
Purch Agt: R H Sheppard
(See Mich, Minn)

CONTINENTAL MINERAL CO (SUBSID OF CONTINENTAL MINERAL PROCESSING CORP)
PO Box 8, Cincinnati 4,
Pres: Frederick A Hauck
VP: Albert E Grogan
Sec: Vincent H Beckman
MILL, Cincinnati, grinding rutile, sircon and ilmenite
Mill Supt: Leslie Brooks

CONTINENTAL MINERAL PROCESSING CORP
1st Nat'l Bank Bldg
Cincinnati 2, Ohio
Pres & Gen Mgr: Frederick A Hauck
VP: Albert E Grogan
Sec: Vincent H Beckman

DOUGLAS MINING CO (M A HANNA CO, AGTS)
1300 Leader Bldg,
Cleveland 14
Chmn of Bd: G W Humphrey
Pres: W A Marting
VP: R H Bartholomew
Sec: S L Engel
Asst Sec: F W Bennett
Treas: R E Beal
(See Minn)

THE EAGLE-PICHER CO, THE INSUL DIV
American Bldg,
Cincinnati 1
Pres: T Spencer Shore
VP: Glen J Christner
Sec: Richard Serviss
Treas: John C Heisler
Comptroller: Harold E Anderson
(See Ill, Kans, Nev, Okla, Wisc)

THE GLIDDEN CO
900 Union Commerce Bldg, Cleveland
Pres: Dwight P Joyce
VP: G M Halsey
Sec: R D Horner
Treas: W G Phillips
Purch Agt: R L Lozon
VP, Engineering: J W Pollard
LAKEHURST MINE, NJ
(See NJ)

M A HANNA CO, THE
1300 Leader Bldg
Cleveland 14
Agent for the following companies:
Butler Bros,
Douglas Mining Co,
Hanna Mining Co,
Hanna Iron Ore Div (Nat'l Steel Co),
Hanna Ore Mining Co,
Morton Ore Co,
Ozark Ore Co,
Philbin Mining Co,
South Agnew Mining Co,
Midwest Ore Co,
Hanna Mines Co,
Hanna Develop Co,
Hanna Minerals Co,
Hollinger-Hanna Ltd,
Lowphos Ore, Ltd,
Maria Luisa Ore Co,
Teal Lake Mining Co
(See Mich, Minn, Ore)

HANNA MINING CO
1300 Leader Bldg
Cleveland 14
Chmn of Bd: J H Thompson
Pres: W A Marting
Exec VP: R W Whitney
VP, Geol & Devel: J K Gustafson
VP, Research: D N Vedensky
Sec: L W Spang
Treas: R E Beal
Asst Sec: S L Engel
L E McChesney
F W Bennett
Asst Treas: F C Teske
(See Mich, Minn & Hanna Nickel Smelting Co, Ore)

HANNA ORE MINING CO
1300 Leader Bldg
Cleveland 14
Pres: W A Marting
VP: R W Whitney
W P Weber
Sec: S L Engel
Treas: R E Beal
Asst Sec: F W Bennett
Asst Treas: F C Teske
(See Minn)

HOBART BROS, CO
Troy
Pres: Edward A Hobart

VP: Wm Hobart, Sr
Sec: Earl C Galbreath
Treas: D Clayton Jenkins

INTERNATIONAL SALT COMPANY
Clarks Summit, Pa
Pres: Edward L Fuller
VP: John L Ryon
Sec: Hervey J Osborn
Treas: Mortimer B Fuller, Jr
Purch Agt: Louis H Healy
CLEVELAND MINE, 2400 Ships Channel, Whiskey Is, Cleveland, undergr, rock salt
Gen Mgr: Leo E Read
Mine Eng: Wm C Bleimeister
(See La, Mich, NY, Pa)

MARBLE CLIFF QUARRIES CO
2100 Tremont Center
Columbus
LEWISBURG MINE, undergr, limestone

MORTON SALT CO
100 N Wacker Dr
Chicago 6, Ill
FAIRPORT HARBOR MINE
Painesville, undergr, rock salt
Gen Mgr: R G Ganong
Asst Gen Mgr:
M P Trainor
Gen Supt: M R Barker
Mine Supt: Grady La Force
Mine Frm: M R Ray
Mine Eng: R R Ryland
Prod: 2, 400 tons
MILL, at mine
Mill Supt: F R Bufka
Asst Mill Supt:
William Rader
(See Ill, Kans, La)

NATIONAL GYPSUM CO
325 Delaware Avenue
Buffalo 2, New York
QUARRY, Gibsonburg, limestone
Plant Mgr: J C Downey
Quarry Supt: R L Wheeler
Prod: 1, 000 tons
MILL, at quarry
(See Aris, Ind, Iowa, Kans, Mich, NY, Pa, Texas, Va)

NATIONAL STEEL CORP HANNA IRON ORE DIVISION (M A HANNA CO, AGTS)
1300 Leader Bldg
Cleveland 14
Pres: W A Marting
VP: R W Whitney
W P Weber
Asst Secs: S L Engel
F W Bennett
Treas: R E Beal
(See Mich, Minn)

OGLEBAY NORTON COMPANY
1200 Hanna Bldg,
PO Box 6508
Cleveland 1,
Pres: E W Sloan, Jr
VP-Mng: W D Hamilton
Sec: G E Guthery
Purch Agt: C J Howley, Jr
VP-Gen Counsel:
J J Dwyer
(See Minn, Wisc)

PHILBIN MNG CO (M A HANNA CO, AGTS)
1300 Leader Bldg,
Cleveland 14
Pres: W A Marting
VP: C B Jacobs
R W Whitney
R H Bartholomew
Sec: S L Engel
Treas: R E Beal
Asst Sec: F W Bennett
Graydon Megan
Asst Treas: W H Lowe
F C Teske

PICKANDS MATHER & COMPANY
200 Union Commerce Bldg, Cleveland 14
Managing operators for:
BALKAN MINING CO,
BENNETT MINING CO,
CAMPBELL MINING CO,
CORNELL MINING CO,
CORSICA IRON CO,
CRETE MINING CO,
CUYUNA ORE CO,
ERIE MINING CO,
HOYT MINING CO,
IRON RANGE MINING CO,
LAKE MINING CO,
MAUTHE MINING CO,
MAHONING ORE & STEEL COMPANY, ODANAH IRON CO, PALMER MINING CO,
PURITAN MINING CO,
SUNDAY LAKE IRON CO,
UTICA MINING CO,
VERONA MINING CO,
WESTERN MINING CO,
YOUNGSTOWN MINES CORP
(See Minn, Mich, Wisc)

PITTSBURGH PLATE GLASS CO, CEMENT DIVISION
Columbia Court
Barberton
ZANESVILLE MINE, Zanesville, undergr, limestone

REPUBLIC STEEL CORP
25 Prospect Ave, NW
Cleveland
Pres: T F Patton
VP: E R Johnson
Gen Mgr: Northern Ore Mines: C H Dewey
Gen Mgr: Southern Ore Mines: J R McVicker
Purch Agt: W T Adams
(See Ala, Mich, Minn, NY)

SOUTH AGNEW MNG CO (M A HANNA CO, AGENTS)
1300 Leader Bldg
Cleveland 14
Pres: A F Peterson
VPs: W P Weber
P B Entrekin
W H Marting
R W Whitney
Sec: S L Engel
Asst Secs:
B D Brocker
Francis Van Nuys
(See Minn)

STANDARD SLAG CO
1200 Wich Bldg
Youngstown
Pres: L A Beeghly
VP: W E Bliss
Sec-Treas: R M Lynch
(See Nev)

U S GYPSUM CO
300 W Adams St
Chicago 6, Ill
QUARRY, Genoa, limestone (dolomite)
Works Mgr: V E Coffman
MINE, Gypsum, undergr, gypsum
Works Mgr: B E Welty
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mich, Okla, Mont, N Mex, NY, Tex, Utah, Va)

OKLAHOMA

AGRICULTURAL GYPSUM CORP
Colony
MINE, 17 mi E of Cordell, open pit, gypsum

AMERICAN ZINC OXIDE CO
1515 Paul Brown Bldg,
St Louis 1, Mo
Pres: H I Young
VP: A C Eide, H L Young
Sec: R C Perkins
VP & Gen Mgr: G L Spencer, Jr
VP & Treas: W J Matthews, Jr
Gen Purch Agt: E K Minear
VP & Cont: C V Burns
RIALTO & BARBARA J MINES, Box 216, Picher, undergr, Zn, Pb
Dist Mgr: D R Stewart
Gen Supt: O L Green
Mng Eng: W F Netseband
Dir, Mtg & Min Benef: Robert Ammon
1, 200-TON FLOT-GRAV MILLS
(See Aris, Ill, Mo, N Mex, Ohio, Tenn, Tex, Utah, Wash, Wisc)

ARKHOLA SAND & GRAVEL CO
323 Merchants Bank Bldg, Ft Smith, Ark
Pres: Robert N Dills
VP & Bd Chmn: Wm Dills
Sec-Treas: Louise Kroh
Purch Agt: Cecil T Womack
Chief Eng: Harper S Jackson
ARKHOLA SAND & GRAVEL CO MINE, PO Box 248, Ft Gibson, undergr, limestone
Gen Supt: Charles E York
Geol: James E Sherman
(See Ark)

BLACKWELL ZINC CO, INC (Subsid of AMERICAN METAL CLIMAX, INC)
1270 Ave of the Americas
New York 20, New York
Pres: H de Neufville
VP: E T Rose, J Vuilleques, A E Lee, C H Asli, W E Long
Sec: E A Weil
Treas: D J Donahue
Purch Agt: W F Price
Controller: L S Cline
SMELTER, Blackwell
Mgr: M L Hughen
Prod: 90, 000 tons Zn yrly
(See American Metal Climax, Inc, NY)

CROSSLAND & LYONS
Box 205
Treece, Kansas
CRANE (BLUE BENNET) MINES, undergr, Zn, Pb
Own & Mine Frm: Ivan Crossland
No Prod

CROSSLAND, WATKINS & ALLEY
Box 221, Treece, Kansas
MCBEE MINE, Zn, Pb
No Prod

THE EAGLE-PICHER CO CHEMICALS & METALS DIVISION
Mining Branch Office & Tri-State Mines Office, Cardin
Pres: T Spencer Shore
Div Pres: Miles M Zoller
Exec VP: Wm D Atteberry
VP, Mng: Claude O Dale
Div Acct: G H Walbert
Dir, Pers & Labor Rel: C D Wood
Ch Geol: D C Brockie
TRI-STATE MINES, Cardin, undergr, Zn, Pb, Ge
Gen Mgr: F J Cuddeback
Mine Supt: Lloyd E Wetherell
Geol: E H Hare, Jr
Trans Supt: C E Mitchell
Maint Supt: Carl T Johnson
Elec Eng: Claude A Rogers
Div Supt: M Huddleston, Bert A Paul, W R Sillaway
Mine Eng: Ernest Moran
No Prod
12, 000-TON FLOT-HEAVY-MED MILL, Cardin
Mill Supt: Fred Phelps
Assay: George L Hall
RETORT SMELTER, Henryetta
Supt: L L Altermatt
Output: 100, 000, 000 lbs Zn yrly
ELECTRONIC METALS PLANT, Miami
Tech Mgr, Elec Metals: C C Habeger
Dir Research: W E Metcalf
Gen Supt: D S Trahin
LEAD SMELTER & ACID PLANT, Galena, Kans
Mgr: Fred Clearman
(See Ill, Kans, Nev, Ohio, Wisc)

HARRISON GYPSUM, INC
PO Box 176, Lindsay
MINE, near Cement, surface, gypsum

HENDERSON-TUCKER
c/o John Henderson
PO Box 281, Picher
MINE, Pb, Zn

KERR-MCGEE OIL INDUSTRIES, INC
Kerr-McGee Bldg
Oklahoma City 2
Pres: D A McGee
Exec VP: F C Love
Sec: S B Robinson
Treas: H H Raborn
Purch Agt: H W Musick
VP, Minerals Dept: George H Cobb
Mgr, Research & Devel: V L Mattson
Mgr, Minerals Explor & Land: R T Zitting
(See Aris, Colo, N Mex, Wyo, and Kermac Nuclear Fuels, N Mex)

MARK TWAIN MNG CO, THE
Box 241, Picher
Pres: W L Childress
VP: W H Childress
Sec-Treas & Gen Mgr: H L Childress
Purch Agt: Wm G Roberts
Mine Frm: C A Enders
JARRETT MINE, 2 mi W & 3 mi N of Picher, undergr, Zn, Pb
No Prod
SKELTON MINE, 1 mi S of Picher, undergr, Zn, Pb
No Prod

NATIONAL ZINC CO
Bartlesville
ZINC RETORT SMELTER
Mgr: B F Buff

OZARK-MAHONING CO MINING DIVISION
310 West 6th St,
Tulsa 19
Pres: C O Anderson
VP: A G Johnson
Sec: R T Lindmark
Treas & Chmn of Bd: S H Davis
Purch Agr: C W Sohasky
(See Colo, Ill, N Mex)

PHILLIPS PETROLEUM CO, MNG & MLG DEPT
Bartlesville
Gen Mgr: T M Hipp
Asst Mg-Contr & Geol: C N Holmes
(See N Mex, Utah)

ST CLAIR LIME CO
Box 894, Oklahoma City
MINE, undergr, lime plant
Geol: Tom Rowland

TONGAHA MINING CO
Box 366, Picher
Pres: Clarence A Miller
VP & Gen Mgr: O K Tucker
Sec: W A Brewer
KITTY MINE, 2 mi W of Picher, undergr, Zn, Pb
Mine Frm: Leslie L Marcus
No Prod

TUCK MNG CO
Box 366, Picher
WILSON MINE, Zn, Pb

TULSA MINERALS CORP
Box 5216, Tulsa
Pres & Gen Mgr: J S Burden
VP: P T Thibodaux
Sec & Treas: W G Eastman

U S GYPSUM CO
300 W Adams St
Chicago 6, Ill
MINE, Southard, Blain Co, open pit, gypsum
Work Mgr: W I Blosser
(See Calif, Colo, Conn, Ind, Ill, Iowa, Mass, Mich, Mont, Ohio, N Mex, NY, Tex, Utah, Va)

UNIVERSAL ATLAS CEMENT DIV, U S STEEL CORP
100 Park Ave, New York 17
New York
WATONGA MINE, Blaine County, surface, gypsum

W M & W MNG CO
Picher
Pres: O K Tucker
VP: F E Williams
Sec-Treas: Ralph Chambers
Purch Agt: O K Tucker
MINE, Ottawa County, Zn, Pb
No Prod

WALTON GYPSUM CO
805 N 8th St, Fairview
MINE, near O'Keene, Blaine County, open pit, gypsum

ZUVEKAS MNG & MLG COMPANY
Baxter Springs, Kans
Own: Clarence Zuvekas
MINE, Pb, Zn
MILL, Kansas
(See Kansas)

OREGON

ARENTZ MNG VENTURE
870 1st Security Bldg
Salt Lake City, Utah
BRETZ MINE, Malheur Co, (mine address: McDermitt, Nev), undergr, open pit, Hg
Supt: Roy F Hickman
Prod: 150 tons
150-TON FLOT MILL, at mine
RETORT SMELTER, at mine
Prod: 150, 000 lbs yrly

ASHLAND MINING CO
835 N Main St, Ashland
Mgr: Dewey & Fred Van Curler
ASHLAND MINE, 3 mi NW of Ashland, undergr, Au, Ag
50-TON GRAV MILL & CONCEN
Under devel

BALTIMORE SYNDICATE LTD
Box 755, Heppner
Gen Part: C M Wagner, MD
MINE, Montana
(See Mont)

BEAR CREEK MINING CO
Idleyld Park
Pres: Billie Joe Polley
VP, Sec-Treas & Purch Agt: James Marler
SAGE HOLLOW MINE, Brothers, E Slope Bear Creek Butte, 17 mi NW of Brothers, open pit, U_3O_8
Under devel

BOAZ MNG CO
708 Joshua Green Bldg
Seattle 1, Wash
Supt: I R Maxfield
BUFFALO MINE, Grant County, Granite dist, undergr, Au, Ag, Cu, Pb
Mgr: J P Jackson
FLOT MILL
Under devel

BOLING, E A
HUDSON, L E
1404 Flower Lane
Grants Pass
ORO GRANDE MINE, Josephine County, Au, Ag, Cu, Pb, Zn

BONANZA OIL & MINES CORP
Pres: Arthur L Albee
VP: D L Milliken
Sec: Frank Kopelman
Treas: J H Beck
MINE, Sutherlin, undergr, Hg
Mine Supt: Tom Bidwell
Asst Mine Supt: James Gogolin
60-TON ROTARY FURNACE
Mill Supt: M L Conn
No Prod

BOURNE MINES
Box 120, Sumpter
MINES, Baker Co, Au, Ag

BRISTOL SILICA CO
Box 427, Rogue River
Pres: Fayette I Bristol
BRISTOL MINE, 5 mi E of Rogue River, surface, silica
Mine & Mill Supt: Rolland Jones
Cons Eng: A O Bartell
Prod: 200 tons
100-TON MILL, Rogue River

CHEM LIME CO
Jackson Towers, Portland
Plant Mgr: Hans Leuenberger
QUARRY, 10 mi W of Baker, lime
KILN, Wingville

EICKEMEYER BROS
Post
MAURY MT MINE, Crook County, Hg

EMERALD EMPIRE MINING CO
Route 3, Box 270
Corvallis
Pres: Wayne R Giesy
VP: Kenneth O Watkins
Sec: Dorothy L Watkins
CHAMPION, MUSICK, HELENA, SUNSET & other mines in Bohemia dist, CINDERELLA, GREAT NORTHERN, GREAT EASTERN and others in Blue River dist; mine address, Disston, 16 mi SE Disston and 28 mi E of Halley, undergr, Au, Pb, Cu, Zn Ag
Gen Mgr: Kenneth O Watkins
Geol: Harold El Barton

GREAT LAKES CARBON CORP, MNG & MLG PROD DIV, DICALITE DEPT
Terrebonne
PLANT NO 2 & MILL, 7 mi W of Terrebonne, surface, diatomite
Mill Supt: E W West
Plant Chem: G P Johnston
(See Calif, Colo, Nev, N Mex)

HANNA MNG CO
PO Box 85, Riddle
NICKEL MTN MINE, surface, Ni
Gen Mgr: E S Mollard
Mine Supt: E J Maney
Mine Frm: H J Servant
Mine Eng: W A Foster
Prod: 6,000 tons
(See Mich, Minn, Ohio)

HANNA NICKEL SMELTING CO (SUBSID OF HANNA MNG CO)
Box 85, Riddle
Gen Mgr: E S Mollard
ELEC MELT PLANT
Mgr: E E Coleman
Supt: L E Rosser
Prod: 22,000,000 lbs nickel yearly
(See Hanna Mng Co, Mich, Ohio) Minn, Ohio)

HARVEY ALUMINUM CO
Torrance, Calif
MINE, Salem Hills area, Marion County, ferruginous bauxite
No Prod

HELTON, RAY L
PO Box 454, Powers
NICKEL CREEK GROUP, Coos County, Au, Ag, Cu, Pb, Zn

HI-POTENTIAL MINES
34 S River Rd, Cottage Grove
Own: Ray E Nelson
VESUVIUS MINE, undergr, Au, Ag, Cu, Pb, Zn, Mn
Under devel
5-TON GRAV MILL, Bohemia
Assayer: Abbott Hanks, Inc
PICKETTS CHARGE MINE, Undergr, Au
Under devel

HOLLOWAY, W H
616 S Oakdale Ave, Medford
JAY BIRD MINE, Jackson County, Sb

KELL, ERNEST F
PO Box 507, Gold Hill
SMUGGLER MINE, Jackson County, Au, Ag, Cu, Pb, Zn

KINGSLEY MINE
Box 105, Seneca
Pres: Glenn Findlay
VP: Bandy Sintay
KINGSLEY MINE, undergr, Cr_2O_3
No Prod

LAKEVIEW MNG CO
Box 1231, Lakeview
Pres: A D Haas
VP & Gen Mgr: J L Robison
300-TON MILL, Lakeview
Mill Supt: J O Vecchies
Mill Frm: Dale Cutting

MINERAL KING MINE
34 S River Rd, Cottage Grove
Own: Harry Williams, Ray Nelson
MINE, Bohemia dist, undergr, Cu, Au
Under devel

PUEBLO MINING CO
1821 S 1st St, Yakima, Washington
Pres: E Griesinger
PUEBLO MINE, Harney Co, undergr and open pit, Hg, Cu, Au, Ag, U_3O_8
Gen Mgr: H C Lawson
Under Devel
(See Wash)

ROYAL ROGUE PROD
2266 Houston Rd, Medford
Own: David W Chase
WAR EAGLE MINE, undergr, Hg
Prod: 24 tons
Under devel
RETORT SMELTER, E fork Evans Creek, Jackson Co; test runs indicate 190 to 300 lb per 24 hr shift

SOLAR-X-CORP
7717 Ustick Rd, Boise, Idaho
Pres: Kenneth Arnold
VP: W E Thalman
Sec-Treas: Don A Woodward
Purch Agt: Ken Arnold
KISKA MINE, Andrews, Harney County, undergr, U_3O_8
Gen Mgr: Kenneth Arnold
Mng Supt: Joe Briggs
Cons Mng Eng: E O Berbillig
Under devel & producing
(See Idaho)

STANDARD MINES, INC
PO Box 387, Prairie City
Pres: D L Olling
VP: V Z Jacobson
Sec-Treas: L D Wilson
MINES, undergr, Au, Cu, Co, Ni
Gen Mgr: L D Wilson
Mine Supt: D L Olling
50-TON FLOT MILL
Mill Supt: V Z Jacobson

SUNBURST, INC
1975 N W Everett St
Portland 9
Chmn of Bd: Walter H Schwedler
Pres: James C Young
Sec-Treas: Kay Critchlow
(See Nev, Utah)

SUPREME PERLITE CO
Box 66, Suttle Rd, North Portland
Part: W I & L H Petterson
10-TON PROCESSING PLANT, North Portland, treating perlite and vermiculite
Mgr: W I Petterson
Mill Frm: Leo Berry

TIMBER BEAST MNG CO
Prospect
Own: George Slade
SNOW-BIRD MINE, PO Box 297, Applegate, 1 mi W of Bonanza on Powell Creek, undergr, Au
Under devel
4-TON GRAV & CYANIDE TEST MILL, at portal

ULBRIGHT & VANAUSDALE
3305 14th St, Route 1, Box 58, Baker
GOLDEN DREAM MINE, Baker County, Au, Ag, Cu, Pb, Zn

WERDENHOFF MNG CO
1005 1/2 S 11th St
Tacoma, Washington
MOTHER LODE, Crook County, Hg

WESTERN MINERALS CO
313 N G St, Lakeview
Pres: W Scott
VP: Joe Felix
Sec: E E Jagnow
Treas: C H Anderson
Mgr & Purch Agt: M E Weatherly
ANGEL PEAK MINE, surface, Hg
No Prod
GRAV MILL, Lake Co,
ROTARY KILN, at mill

PENNSYLVANIA

ALAN WOOD STEEL CO
Conshohocken
Pres: H R Wood
VP, Oper: W E Boger
VP, Marketing: H W Read
Sec-Treas: W M Webb
Purch Agt: C Bishop
(See NJ)

ALUMINUM CORP OF AMERICA
1501 Alcoa Bldg, Pittsburgh 19,
Pres: Lawrence Litchfield, Jr
VP, Raw Mat & Ref: George W Streepey
Sec: Alfred M Hunt
Treas: Matt W Stanley
Purch Agt: Thomas O English
Gen Mgr, Raw Mat Div: R F Miller
(See Ark, Ill, Ky, Tex)

BESTWALL GYPSUM CO
120 E Lancaster Ave
Ardmore
Pres: Rawson G Lizars
Exec VP: Malcolm Meyer
Sec: Arthur D Graves
VP & Treas & Compt: J R Johnston, Peter Williamson
Purch Agt: J I Trolley
Asst Sec & Treas: J L Strickland
(See Iowa, Kans, Mich, NY, Tex, Utah)

BETHLEHEM CORNWALL CORP
701 E Third St, Bethlehem
Pres: A F Peterson
Mgr: S J Shale
CORNWALL MINE, Cornwall, undergr, Fe, Cu, Au, Ag, S
6,000-TON MAG CONCEN
2,500-TON FLOT PLANT
1,600-TON SINTERING PLANT
GRACE MINE, Morgantown undergr, Fe
MAG CONC, FLOT PLANT, PELLETIZING PLANT

FOOTE MINERAL CO
18 W Chelten Ave
Philadelphia 44
Pres: L G Bliss
VP, Prod: F B Shay
Sec-Treas: W R Spofford
VP, Mktg: J S Gates
Purch Agt: W J Brooking
(See NH, NC, Tenn, Va)

GENERAL REFRACTORIES CO
1520 Locust St, Philadelphia 2
MINE, Ga, kaolin
(See Ga)

GRAPHITE CORP OF AMERICA
Box 9, Chester Springs
Pres: Josef Milner
VP: Stanley Milner
Treas-Sec: Barry Hersch
Purch Agt: C A Schmehl
MINE, graphite, open pit
Gen Mgr: C A Schmehl
Prod: 300 tons
300-TON MILL, at mine

HARBISON-WALKER REFRACTORIES CO
307 Fifth Ave, Pittsburgh
Pres: E A Garber
Exec VP: A B Wilson
Sec: G F Cronmiller, Jr
Treas: L E Mock
Purch Agt: R P Snyder
(See Ala, NC)

INTERNATIONAL SALT COMPANY
Clarks Summit
Pres: Edward L Fuller
VP: John L Ryon
Exec VP & Sec: Hervey J Osborn
VP & Treas: Mortimer B Fuller, Jr
Purch Agt: Louis H Healy
(See La, Mich, NY, Ohio)

JONES & LAUGHLIN STEEL CORP
3 Gateway Center
Pittsburgh 30
Chmn of Bd: A C Adams
Pres: C M Beeghly
VP, Prod: A T Lawson
VP & Treas: H H Wunderlich
VP, Purch: J W Lindsey
Sec: W R Compton
Gen Mgr, Ore Mines & Quarries: C C Henning
Asst Gen Mgr, Ore Mines & Quarries: C M Lichy
(See Mich, Minn, NY)

MOLYBDENUM CORP OF AMERICA
Washington
Wks Mgr: Eugene F Lucas
PLANT, Washington, Mo, WO_3
PLANT, York, Mo, WO_3, rare earths
Mgr: W F Allen
(See Calif, Colo, N Mex, NY)

NATIONAL GYPSUM CO
325 Delaware Ave
Buffalo 2, New York
MINE, Bellefonte, undergr, limestone
Plant Mgr: H E Gustafson
Mine Supt: J Pinto
Prod: 2,000 tons
MILL, at mine
QUARRY, York, limestone
Plant Mgr: P R Bartram
Quarry Supt: C E Tesnow
Prod: 600 tons
MILL, at quarry
(See Ariz, Ind, Iowa, Kans, Mich, NY, Tex, Va)

NEW JERSEY ZINC CO
160 Front St, New York 38, New York
MINE, Friedensville, undergr, Zn
Supt: S S Huyett
Mine Mgr: H B Wiles
Services: M S Childs
Eng-Geol: W T Forsyth
2,500-TON FLOT MILL,
Mill Mgr: J R Pellett
RETORT, Palmerton
Supt: G F Halfacre
(See Colo, Ill, NJ, N Mex, NY, Tenn, Va, Wisc)

PRINCE MFG CO
Bowmanstown
MINE, undergr, mineral pigment
No Prod

ST JOSEPH LEAD CO
250 Park Ave, New York 17, New York
SMELTER, Josephtown
Mgr: John G Wehn
(See Mo, NY)

SNYDER MINING CO
812 Oliver Bldg, Pittsburgh
Pres: W P Snyder, III
VP & Gen Mgr: Fayette Brown, Jr
Sec: W Laird Davis
Treas: J K Foster
Purch Agt: Stanley J Hill, Chisholm, Minn
(See Minn)

UNITED STATES STEEL CORP
525 William Penn Place
Pittsburgh 30
Pres: L B Worthington
Exec VP, Intern & Raw Mat: M W Reed
Sec: B L Rawlins
Treas: W H Lang
VP, Purch: R C Moffitt
(See Ala, Calif, Minn, Tenn, Utah, Wyo)

WOODBURY CLAY CO
819 Allegheny St, Hollidaysburg, Pa
Mgr-Part: J M Stevens
MINE, open pit, refractory clay

SOUTH CAROLINA

BELL KAOLIN CO
Gleason, Tenn
MINE, Aiken, kaolin

COMMERCIALORES, INC
Box 98, Clover
Pres: John Strohl
VP: H S Doty
Sec: E A Jacobus
Purch Agt: H L Wright

HENRY KNOB MINE, 4 mi W of Clover, surface, kyanite, pyrite
Plant Mgr: J E Castle
Mine Frm: Leonard Hardin
400-TON FLOT MILL, at mine
Mill Frm: Richard Lachmund

J M HUBER CORP
Clearwater
PARAGON & BARDEN MINES, kaolin

INDUSTRIAL MINERALS INC
York
Pres & Gen Mgr: L G Wilson
VP & Sec: W F Wilson
KINGS CR MINE, 14 mi W of York, open pit, open pit, barite
Chief Eng: S J Beers
Mine Frm: W M Westmoreland
Prod: 100 tons
KINGS CR FLOT MILL, 25-ton crush & grind

INTERNATIONAL CLAY CORP
Graniteville
MINE, kaolin

NATIONAL KAOLIN PRODS CO
Box 431, Aiken
MINE, kaolin

OREFRACTION MINERALS, INC
Andrews
GRINDING PLANT, sircon

PACO PRODUCTS, INC
Pacolet
FLOT-MILL, Spartanburg County, feldspar, silica, mica

SOUTHEASTERN CLAY CO
Aiken
JOHNSON, RODGERS, GARDNER & TOOLE MINES, kaolin

UNITED CLAY MINES CORP
North Aiken
MINE #7, open pit, kaolin, fuller's earth
Mine Supt: J J Godla
MILL, at mine
(See Fla, Ga, Md, NJ, Tenn)

ZONOLITE CO
Enoree
Pres: J A Kelley
Purch Agt: M E Chambers
MINE, open pit, vermiculite
Gen Mgr, Mine: A H Skardon
Mine Frm: J Brewington
FLOT MILL, Enoree
Gen Mgr, Mill: O F Stewart
Mill Supt: Lewis J Nash

SOUTH DAKOTA

A B W MINERALS
Custer
MINE, pegmatites

A & V MINING CO
Custer
MINE, Custer Co, pegmatites

ABINGDON POTTERIES INC
Abingdon, Ill
WHITE ELEPHANT MINE, Custer Co, pegmatites

ALBRIGHT MNG CO
F J & Frank Albright, Box 1054, Edgemont
GREEN ACRE #3 & 4 MINES, Fall River Co, U_3O_8

AMERICAN COLLOID CO
5100 Suffield Ct, Skokie, Ill
BELLE MINE, Belle Fourche, surface, bentonite
Mgr: Claude Acord
Prod: 600 tons
(See Ill, Miss, Wyo)

AMERICAN MNG & SMELTING, INC
344 Fifth St, Spearfish
MALONEY BLUE MINE, Cu

BALD MTN MNG CO
Trojan, and Box 231, Clinton, Iowa
Pres: O D Collis
Treas: Ward Reidesel
Asst Gen Mgr: A F Zupel
PORTLAND, CLINTON, DAKOTA, DECORAH MINES, Trojan, undergr, open pit, Au, Ag
No Prod
350-TON CYANIDE MILL, Trojan, Au
No Prod

BEAR LODGE MINERAL CORP
310 W 23rd St, Cheyenne, Wyo
MINE, U_3O_8

BETTENHAUSEN & WHEELER
Edgemont
BUD MINE, U_3O_8, V_2O_5

BLACK HILLSY KEYSTONE CORP
Keystone
Pres: W K Wallace
INGERSOLL MINE, 2 mi NW of Keystone, undergr, open pit, pegmatite minerals, lepidolite, mica, tantalite, feldspar, beryl
Supt: Harry Leis
50-TON FLOT MILL
Mgr: A I Johnson

BLACK HILLS SILICA SAND CORP
Box 21, Hill City
Pres: Mont Humprehus
VP: Roy Bristol
Sec-Treas: Marion Cramer
Purch Agt: Leslie Wade
WORK LODE NO 1, 3 mi S of Deerfield store on Ditch Creek; or 24 mi W of Hill City, open pit
Gen Mgr: Leslie Wade
Gen Supt & Mine Frm: Joe Wade
Geol: Mont Humprehus
Prod: 300 tons
200-TON SCREEN MILL, Redfern
Mill Supt & Frm: Joe Wade

BLACK HILLS URANIUM CO
Box 881, Edgemont
Pres: Roy E Chord
VP & Sec: Eugenia Chord
Part: Charles Webber & Robert Maywell
HOLD UP 15, HOT POINT & CLARA BELL MINES, undergr, U_3O_8
Gen Mgr: Wayne Sundstrom
Asst Gen Mgr: Leonard Komes
Gen Supt: John Beehwer
Geol: Frank Wolbaum
Prod: 300 tons from each mine

BLAND MNG & MLG CO
Box 734, Custer
Pres: G V Bland
VP: G C Bland
BEECHER #3 MINE, undergr, open pit, beryllium, feldspar, mica, tantalum, lithium
Mine Supt: G C Bland
GRAV MILL, at mine

BROWN, MATTHEW J
Edgemont
MATIAS PEAK & TAYLOR LEASE MINES, U_3O_8
Under devel
BARKER & HOWELL, DEXTER #4 & LION #1 MINES, Fall River County, U_3O_8

CHASE MNG CO
Box 743, Edgemont
Pres: M L Chase
PABST #3 MINE, undergr, U_3O_8, V_2O_5
Prod: 50 tons
B & H CLAIMS 1-8, undergr, U_3O_8, V_2O_5
Under devel

CHORD URANIUM CO
Box 881, Edgemont
DARROW, KING MINES, 13 to 15 mi N of Edgemont, U_3O_8
Prod: 400 tons per month

DAKOTA BERYLLIUM & OIL CO
Edgemont
RED BIRD LODE, pegmatites

DOUBLE R MINES
144 S 8th St, Custer
Part: Raymond Hurley, Jr & Robert L Cullum
SMITH MINE, undergr, & open pit, Be, feldspar, Cb
Prod: 2 tons

EDSON, THOMAS M
Keystone
MINE, Pennington County, pegmatites

HAPPY JACK MINE
RR 1, Box 93, Custer
Own: Otto F Koch
MINE, feldspar, Be
No Prod

EVERETT AND MARIE HILL
Star Route, Hot Springs
MINE, U_3O_8

HOMESTAKE MNG CO
Lead
HOMESTAKE MINE, undergr, Au
Mgr, Black Hills oper: James O Harder
Mine Supt: C N Kravig
Asst Mine Supt: W C Campbell
Ch Geol: A L Slaughter
Ch Mech Eng: LeRoy Seyhers
Ch Met: C E Schmidt
Ch Elec Eng: Rex Tario
Safe Engr: Phil Graves
Purch Agt: F E Bryan
Prod: 4, 700 tons
4, 700-TON CYAN MILL, at mine
(See Calif, N Mex, Utah, Wyo; Homestake Partners & Homestake-Sapin Partners)

INTERNAT'L MINERALS & CHEMICAL CORP
5401 Old Orchard Rd, Skokie, Ill; Box 451, Belle Fourche
Gen Mgr: K L Arthur
MINES, Custer, open pit, feldspar
200-TON MILL, Custer, dry grinding
Mine Frm: A E Boone
MINE, Keystone, open pit feldspar
75-TON MILL, Keystone
Mine Supt: A E Boone
Mine Frm: irven Green
(See Ariz, Fla, Ill, Maine, Miss, N Mex, NC, Tenn, Va Wyo)

JUDSON, L W
HOUGH, WALTER
Box 108, Custer
MINE, Pennington County, pegmatites

KAUTZCH, HENRY
1118 Canal St, Custer
MINE, Custer Co, pegmatites

KENNEDY, MIKE
216 N 3rd, Custer
MINE, Custer Co, pegmatites

KEY CHEMICAL CO
Keystone
MINE, Custer Co, pegmatites

KEYSTONE FELDSPAR & CHEMICAL CO
Keystone
Mgr: Thomas Edsen
Pegmatite producer

LIEN, PETER, & SONS
Box 1072, Rapid City
Pres: Peter C Lien
VP: Charles H Lien
Sec-Treas: Bruce A Lien
QUARRY & KILN, limestone
Gen Supt: Robert Groethe
Geol: Ray Smith
Mine Supt: Al Johnson
Elec Eng: Elmo More

LONG, J D
Custer
MINE, Custer Co, pegmatites

LORENZ BROS
Hot Springs
DAMSITE #1, 8 mi NE of Edgemont, U_3O_8
Under devel
WASHBOARD MINE, Fall River County, U_3O_8

M I L URANIUM CO
c/o Emmet Isaacs
1006 Farlow Ave, Rapid City
HAY & FAYE #5 & 6 MINES, Fall River County, U_3O_8

MCKENNA, WALTER L
Box 884, Edgemont
GOULD EAST RIM MINES, U_3O_8, V_2O_5
RIPSNORTER MINE, U_3O_8
No Prod

MERICAL EXPLOR CO, INC
325 E Blvd, Rapid City
Pres: Harold Grundahl
VP: Larry Barr
Sec: Maxine Webb
RED FAWN MINE, Custer, undergr, mica, beryl, feldspar
Gen Mgr: Mike Kennedy
Asst Gen Mgr: Langdon Landis
Elec Eng: Don Larson
Mine Supt: Alan Bergen

MINERALS MILLS, INC
Custer
Pres: Albert Gushurst
Sec & Gen Mgr: A I Johnson
GLENWOOD MINES, 4 mi NW of Custer, mica
Under devel

MINES DEVELOPMENT, INC
777 Grant St, Denver 3, Colorado
Pres: Allen D Gray
Sec-Treas: W H Hoadley
Asst Sec: T J Vogenthaler
Asst Treas: R C Meysing
Purch Agt: P M Cheney
MILL, Edgemont
Mgr: H D Webb
Maint Frm: C C Bennett
Prod Frm: O M McGuire
Plant Met: F G Richards
Cap: 400 tons U_3O_8 ore
(See Colo)

MYLER MINING
907 Clark St, Rapid City
Own: C L Myler
SACKETT FRACTION & MYLARD MINES, Keystone, open pit, Be, mica, feldspar, Ta
Gen Mgr: C L Myler

NATIONAL LEAD CO, BAROID DIVISION
PO Box 651, Belle Fourche
Local Rep: Dave Rowland
(See Ark, Calif, Colo, La, Mo, Mont, Nev, NY, Tex, Tenn, Utah, Wyo)

STEPHAN CHEMICAL CO, MAYWOOD CHEM WORKS DIVISION
Edens at Winnetka, Northfield, Ill
Pres: A C Stephan, Jr
Exec VP: D B Hatcher
Sec: W J Crepeau
Treas: M A Pardieck
Purch Agt: G Karch
ETTA MINE, Keystone, spodumene
Watchman: Edvald Hayes
No Prod

STRAWBERRY HILL MINING CO
Whitewood
Pres: Dewey J Hoffman
VP: Blanche Hoffman
Sec: Maurice Hoffman
STRAWBERRY HILL MINE, Rapid City, open pit, Fe_2O_3
Lessor: Pete Lien & Sons
Mine Supt: Ray Smith

SUSQUEHANNA-WESTERN, INC
777 Grant St
Denver, Colo
Pres: Allen D Gray
VP & Treas: W H Hoadley
Purch Agt: P M Cheney
Mgr, Met Div: G H Bryant
Mgr, Raw Mat Div: S S Merwin
Mgr, Ore Procurement: A W Runge
Mgr, Adm Div: T J Vogenthaler
TRIANGLE MINE, Edgemont; 30 mi NW of Edgemont, undergr & open pit, U_3O_8
Mine Supt: P W Peter
Asst Mine Supt: K L Hudson
Prod: 300 tons
(See Colo, Tex, Wyo)

YORK MINERALS
849 Custer Ave, Custer
Pres: L R York
VP: Joe Cavaletto
Sec-Treas: Virginia Klodt
RED DEER MINE, Custer Co, mica, beryl
Mine Supt: Francis Duncan
Prod: 500 tons

TENNESSEE

AMERICAN ZINC CO OF TENN (SUBSID OF AMERICAN ZINC, LEAD & SMELT CO)
Mascot
VP: H A Coy
Mgr: William Black
Gen Supt: M J Langley
Mgr of Mines: R E Calhoun
Supt, Jefferson County Mines: Harry L Miller
Supt, Young Mine: R R Medley
Supt, Mascot No 2 Mine: Glenn Hurst
Purch Agt: C C Sisk
Ch Eng: W H Johnson
Ch Geol: C R L Oder
Supt, Mech-Elec Dept: Ivan D Campbell
Personnel Dir: J L Allison
Safety Eng: H F Thompson
Ch Chem: D E Chadwick
Mill Supt: J H Polhemus
Asst Mill Supt: J P Snider
MASCOT NO 2 MINE, Mascot, undergr, Zn Sulphide
YOUNG MINE, South Friends Station, undergr, Zn Sulphide
NORTH FRIENDS STATION MINE, North Friends Sta, undergr, Zn Sulphide
GRASSELLI MINE, New Market undergr, Zn Sulphide
COY MINE, Jefferson City undergr, Zn Sulphide
4, 500-TON FLOT GRAV MILL
HMS, Mascot
(See Ariz, Mo, Ill, Ohio, Okla, Tex, Utah, N Mex, Wash, Wisc)

ARMOUR AGRI CHEMICAL CO
Columbia
Supt: W B King
McKENNON MINE, phosphate
(See Fla)

B & T MNG CO
Box 650, Bristol
Part: Harold & J E Tipton
B & T MINE, Johnson County, open pit, Mn
Gen Supt: J R Sluder

CAROLINA-SOUTHERN MNG CO, INC
Box 9, Kingsport
Pres: C P Edwards, III
VP & Purch Agt: J T Blanchard
Sec: Elizabeth Powell
Treas: Wanda B Hammett
MINE, Mailing
Mine Supt: George W Edge
Prod: 40 tons
MILL, NC
(See NC)

COLUMBIA ROCK PROD CORP
Pressnell Bldg, Columbia
Pres: Wayne Pressnell
VP: Harry Pressnell
Sec-Treas: Wm C Fraser
Asst Sec-Treas: W J Davis
MINE, undergr, limestone
Gen Mgr: Harry Pressnell
Prod: 2, 000 tons
2, 000-TON MILL, Columbia

COWAN STONE CO
Route 1, Sherwood
ANDERSON MINE, undergr, high calcium, limestone
Supt: Jim Crownover

FELDSPAR CORP, THE
Erwin
GRINDING MILL, dry grinding Feldspar
Supt: T S Hughes
Asst Supt: Ford McKinney
(Subsid of Pacific Tin Consol Corp, NY)
(See Ga, NC, Conn, Pacific Tin Consol, NY)

FOOTE MINERAL CO, ELECTRO MANGANESE DIVISION
1400 Loraine
Knoxville 1
Div Acct: Otto Neumann
TWO PLANTS, Knoxville
1323 Proctor St
1400 Loraine St
(See NH, NC, Pa, Va)

HARDY SAND CO
Box 476, Evansville, Ind
MINE, Benton Co, silica

HOOKER CHEM CORP
Columbia
PLANT, phosphate

INTERNAT'L MINERALS & CHEMICAL CORP
5401 Old Orchard Rd, Skokie, Ill
MICA PLANT, Erwin, dry grinding
Gen Supt: H McIntyre
100-TON MICA FLOT PLANT, Greenville
Gen Supt: John Parrish
(See Ariz, Fla, Ill, Maine, Miss, N Mex, NC, SD, Va, Wyo)

MCMINN BARIUM CORP
PO Box 165, Sweetwater
Pres: Carl A Richesin
Sec-Treas: J M Godsey
MINE #1, route 3, Athens; MINE #2, route 2, Niota; open pit, Ba
Gen Mgr: Carl Richesin & J M Godsey

MONSANTO CHEM CO
Columbia
MINE, 7 mi SW of Columbia, surface, dragline excav, phosphate
Gen Mgr: J L Whiteside
Prod Supr: R L Neubert
Maint Supr: W G Allen
Pers Supr: F C Thomas, Jr
Local Mines Supr: J W Steenbergen
Purch Agt: R G Black
Mine Supt: H A Webster
Asst Supt: Wm Collette
Furnace Supt: C M Hales
Eng Supt: H C Nelson
Maint Supr: Norman Smithson
Prod: 2, 800 tons
GRAV MILL
ELEC FURN, 25, 000 - kw
yellow phosphorus
(See Idaho, Mo)

NATIONAL LEAD CO BAROID DIVISION
Box 187, Sweetwater
Mine & Mill Supt: J T Keim
Asst Supt: H K Beggs
BALLARD, JONES & STEVENS MINE, surface, barite
Prod: 75 tons
200-TON GRAV MILL, washing, jigging, grinding
Mill Frm: Jack Goodman
(See Ark, Calif, Colo, La, Mo, Mont, Nev, NY, SD, Tex, Wyo)

NEW JERSEY ZINC CO
160 Front St, New York 38, New York
JEFFERSON CITY & FLAT GAP MINE, Jefferson City, undergr, Zn
Asst Mgr of Mines, Tenn Oper: Johnson Crawford
Supt: H G Miller
Mine Ch: D H Jolly
Plant Ch: R E Dougherty
Mine Frm: J F Provost
MILL
FLAT GAP OPERATION, Treadway
Supt: J I Craig
Mine Ch: Ashlock
(See Colo, Ill, NJ, N Mex, NY, Pa, Va, Wisc)

PRESSNELL PHOSPHATE CO, INC
Pressnell Bldg, Columbia
Pres: Wayne Pressnell
VP: Harry Pressnell, H R Mosley
Sec-Treas: W J Davis
Asst Sec-Treas: Wm C Fraser
MINE, surface, phosphate
Prod: 1, 000 tons
150-TON FLOT MILL, Columbia

RIVER & RAIL PHOSPHATE CO
135 2nd Avenue N, Nashville
Pres & Gen Mgr: L H Jordan
Sec: S E Wheeler
Gen Supt: Claude Warren

MINE, 6 mi NW of Nashville, surface, dragline, raw phosphates
PLANT, Jordonia, Tenn

SEWANEE SILICA CO
Sewanee
MINE, silica
PLANT, glass sand, silica flour

SMITH MINES, INC
Route 3, Sweetwater
SWEETWATER MINE, Ba

TENNESSEE COPPER CO
Copperhill
EUREKA, BOYD, CALLOWAY, MARY MINES, Ducktown, Polk County, undergr, sulphuric acid, Fe, Cu, Zn
Pres: T A Mitchell
Mgr: R R Burns
Gen Supt: L Weaver
Geol: Owen Kingman
Elec Eng: L B Murray
Mine Supt: H F Kendall
Asst Mine Supt: R G Clay
Prod: 110, 000 tons mnthly
110, 000-TON FLOT MILL, Ducktown
Mill Supt: F M Lewis
REVERB SMELTER, Copperhill
Supt: W Y Querry
Asst Supt: W F Hardin
Output: 20, 000, 000 lbs Cu yearly

TENNESSEE MNG CO
Madisonville
NONABURG MINE, Fe

TENNESSEE VALLEY AUTHORITY
Knoxville
KNOB CREEK, Columbia, 3 mi N of Columbia, surface, phosphate
Gen Mgr: Aubrey J Wagner
Gen Supt & Geol: R S Ingle
Mng Eng: Henry T Putz
Safety Eng: Karl W Potts
Mine Supt: Charles A Irwin
Prod: 750 tons

UNITED CLAY MINES CORP
Gleason
Mine Supt: C A Roberts
Asst Mine Supt: Doyle Bullock
Mine Eng: R D Lowe
MINE #6, open pit, ball clay
MILL, at mine
(See Ga, Fla, Md, NJ, SC)

U S STEEL CORP, TENNESSEE COAL & IRON DIVISION
Jefferson City
ZINC MINES WORKS
Gen Supt: R T Wilson
Geol: S K Mynatt
MINE, undergr, open pit, Zn
Mine Supt: C E Piper
Mine Frm: H H Kerr
Mine Eng: J A Miller
FLOT MILL
Mill Supt: J A Rhoton
(See Ala, Calif, Minn, Pa, Utah, Wyo)

VICTOR CHEM WORKS DIV OF STAUFFER CHEMICAL CO
155 N Wacker Dr, Chicago 6, Ill
MINE, Mt Pleasant, phosphate
GLOBE MILL
(See Ill & Mont)

VIRGINIA-CAROLINA CHEMICAL CORP
401 E Main St, Richmond, Va
MINE, Mt Pleasant, open pit, phosphate rock
Mgr: M D Girardeau
(See Fla, Va)

WEST, M C
PO Box 381, Columbia
BRATTON & TENNESSEE MINES, phosphate

WOLF CREEK MINING CO, INC
Del Rio
Pres: R O Girvin
Sec-Treas: L G Wilson
WOLF CREEK MINE, undergr, Ba
Gen Supt: N A Pratt
Prod: 15 tons
60-TON GRAV MILL, at mine

TEXAS

ALUMINUM CO OF AMERICA
1501 Alcoa Bldg
Pittsburgh 19, Pa
Pres: Lawrence Litchfield, Jr
REFINING & REDUCTION WORKS, Point Comfort & Rockdale
Oper Mgr: B H Sloane, Point Comfort
Oper Mgr: A R Sugg, Rockdale

AMERICAN SMELTING & REFINING CO
Box 1111, El Paso
Mgr: Ben D Roberts
EL PASO SMELTING WORKS, 2 mi N of El Paso, Pb, Cu smelting & converting, Zn fuming
Supt: T J Woodside
Pl Eng: J W English
Supply Agt: R E Redman
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, Neb, NJ, N Mex, NY, Utah, Wash)

AMERICAN ZINC CO OF ILLINOIS (SUBSID OF AMERICAN ZINC, LEAD & SMELTING CO)
Box 577, Dumas
RETORT SMELTER, Dumas
VP & Mgr: W E R Smith
Supt: G R Bailey
Pl Eng: O B Thomas
Purch Agt: W G Hollifield
Office Mng: J C Kersten
Output: 100, 000, 000 lbs Zn yearly
(See Ariz, Ill, Mo, Ohio, Okla, Tenn, Wash, Wisc)

BESTWALL GYPSUM CO
120 E Lancaster Ave
Ardmore, Pa
MINE, Acme, Hardeman Co gypsum
(See Iowa, Kans, Mich, NY, Pa, Utah)

THE CELOTEX CORP, HAMLIN DIVISION
120 S LaSalle St
Chicago 3, Ill
MINE, Longworth, Fisher County, gypsum
(See Ill, Iowa)

DUVAL SULPHUR & POTASH CO
1906 First City Natl Bank Bldg, Houston 2
Pres: W P Morris
ORCHARD MINE, 2 mi SE of Orchard, Fort Bend Co, sulphur
Res Mgr: D E Cochran
(See N Mex, Ariz)

FLINTKOTE CO, THE
Sweetwater
MINE, Sweetwater, Nolan County, gypsum
(See Ariz, Calif, Nev)

FREEPORT SULPHUR CO
1408 Whitney Bldg, New Orleans 12, La; Box 248, Brazoria
HOSKINS MOUND, SE of Angleton, Brazoria Co, sulphur
NASH DOME, NE of Damon, Fort Bend Co, sulphur
(See La, NY)

GOSILE CORP
116 Fannin St, San Antonio
120 1/2 E Pine, Deming, New Mexico
Pres: Walter B Walters
VP: Keith Lyons, Sr
Sec: Jack V Gates
Treas: Henry W Uecker
Purch Agt: W B Walters
Atty: Robert H Rice
MINES, N Mex
(See N Mex)

HEART OF TEXAS MINING CORP
210 N Norwood Dr, Hurst
Pres: W O Ferguson
VP: H L Merrill, Sr
Sec: Henry McCabe
Treas: E E Markwardt
Purch Agt: Henry F McCabe & Foster Bruner
HEART OF TEXAS MINING CORP MINE, PO Box 429, Brady; mine at Voca, open pit, silica sand
Gen Mgr: Henry F McCabe
Gen Supt: Foster Bruner
MILL, Brady, drying & screening oper
Mill Supt: Foster Bruner

HELLAMAE MINING CORP
PO Box 216, Terminal
Pres: Charles M Day
(See N Mex)

HOLLY CORP
1212 Hartford Bldg, Dallas
Pres: Guy M Willis
VP: Robert I Haggart
HERMES MINE, Idaho
(See Idaho)

JEFFERSON LAKE SULPHUR CO
1408 Whitney Bldg
New Orleans 12, La
Pres: E H Walet, Jr
LONG POINT DOME, PO Box 248, Brazoria, Fort Bend County
VP & Gen Mgr: Harvey A Wilson
Asst Gen Mgr: L V Lebeuf
Geol: J Hendrix
Mech Eng: T R Trahan
Met: I E Warren
Elec Eng: Oliver Romero
Asst to VP & Gen Mgr: H J Grace
Prod: 800 long tons
(See Calif, La)

LONE STAR STEEL CO
Box 12226, Dallas; Field Office: Lone Star
Pres: E B Germany
Exec VP: W H Johnson
VP, Oper: L G Graper
VP, Sales: W T Moreland
VP, Pub Rel & Adv: L D Webster
VP, Purch & Sec: J M Morris
VP, Cont & Asst Treas: Max Dodson
Works Mgr: J M Brashear
COKE & IRON DIV
Div Supt: Coke & Iron: S G Anderson
Supt, Blast Furnace: F G Stark
Asst Supt, Blast Furnace: J M Thompson
Supt, Ore Div: A B Drescher
Supt, Mng: V F Malone
Asst Supt, Benef: V Camp
Chief Ore Eng: E F Dressner
Gen Frm, Mng: R T Dudley
Gen Frm, Benef: I J Bassett
SERVICES
Ch Eng: J O Ferrell
Safety Mgr: L E Jenkins
LONE STAR MINES: BLACK MT, KING, ROGERS & OTHERS, open pit, Fe
Prod: 13, 000 tons
13, 000-TON GRAV MILL, Lone Star, clay scrubbing, calcining, sintering
BLAST FURNACE, Lone Star
Supt: Frank Stark
Asst Supt: Jack Thompson
Cap: 1, 300 tons

MAGNET COVE BARIUM CORP
Box 6504, Houston 5
MINE, Zavalla, Angelina County, open pit, clay (bentonite)
Div Mgr: C L Wilkinson, Jr
Pl Mgr: A T Donovan
250-TON MILL, dry grinding
Mill Frm: Robert Chambers
BARITE GRINDING PLANT, Brownsville
(See Ark, Fla, Mo, Nev, Wyo)

MORTON SALT CO
110 N Wacker Dr
Chicago 6, Ill
MINE, Grand Saline, salt
Mgr: Reid Lesser
Asst Mgr: J L Sellers
Prod: 800 tons
(See Ill, Kans, La, Ohio)

NATIONAL GYPSUM CO
325 Delaware Ave
Buffalo 2, New York
QUARRY, Rotan, gypsum
Plant Mgr: V W Hill
Quarry Supt: T Smith
Prod: 1, 000 tons
MILL, at quarry
(See Ariz, Ind, Iowa, Kans, Mich, NY, Pa, Va)

NATIONAL LEAD CO

BAROID DIVISION
Box 1675, Houston 1
Gen Mgr: G B Coale
Asst Gen Mgr: J W Hofstetter, E J Hagstette, Jr
Prod Mgr: Reginald Rowand
CORPUS CHRISTI PLANT, barite, dry grinding mill
Mill Supt: L M Baker
HOUSTON Plant, bentonite, barite, dry grinding mill, oil well chem
Supt: R J Penrose
MULDOON MINE, Muldoon, bentonite, surface
Supt: R J Penrose
TEXARKANA PLANT, Texarkana, oil well chem, dry grinding
(See Ark, Calif, Colo, La, Mo, Mont, NY, SD, Tenn, Wyo)

NATIONAL LEAD CO, TEXAS MINING & SMELTING DIVISION
Box 559, Laredo
Mgr: J C Archibald, Jr
Ch Chem: Fidel Gonzales
Compt: Claude Notzon
REVERB & BLAST FURNACES, FUMING PLANT, highway 81, N Laredo
Pl Supt: R L Kulpaca
(See Ark, Calif, Colo, La, Mo, Mont, Nev, NY, SD, Tenn, Wyo)

PHELPS DODGE REFINING CORP (Subsid of PHELPS DODGE CORP)
Box 1372, El Paso
ELEC COPPER REFINERY
COPPER SULPHATE PLANT, also NiSO, Se, Te
Works Mgr: E W Donahue
Asst Works Mgr: M S Bell
Prod: 576, 000, 000 refined Cu yearly
(See Ariz, N Mex, NY)

PIONEER TALC CO
Allamoore
Pres: M W Glenn
VP: C N Clark
Sec: W W Roff
Treas: Francis T Glenn
MINE, Allamoore, open pit, talc
Gen Supt: Albert Gregory
160-TON MILL, Allamoore, ground talc

RADIATION EXPLOR CO, INC
Box 151, Henrietta
Pres: C L Brownlow
VP: James W Heath
Sec: Paul Eggers
TWIN RATTLER & CROWN MINES, Poet, open pit, U_3O_8
Gen Mgr: C L Brownlow
No Prod

RARE METALS CORP OF AMERICA
6th Floor, El Paso Natural Gas Bldg, 315 E 2nd South
Salt Lake City 11, Utah
(Affiliate of EL PASO NATURAL GAS CO, Texas St at Stanton, Box 1492, El Paso)
Pres: C L Perkins
VP: H M Kline
(See Ariz, Idaho, N Mex, Utah)

REYNOLDS MINING CORP
Reynolds Metals Bldg
Richmond 18, Virginia
Pres: Walter L Rice
VP: R H Zeglin
Sec: Ailyn Dillard
Treas: C E Coghill
Exec Asst to Pres: Sheldon P Wimpfen
150-TON FLOT MILL, Eagle Pass, CaF_2
Gen Mgr: R H Zeglin
Mgr: E O Soret
Mine Supt: E G Ovits
(See Ark, Va)

SILVER STAR-QUEENS MINES, INC
909 Trans American Life Bldg, Fort Worth 2
Pres: Joseph A Foster
VP & Sec: Robert Decker
Treas: Ned James
Purch Agt: Ralph Thurston
(See Idaho)

SOUTHWESTERN GRAPHITE CO
Burnet
Pres: George W Clemson
VP: Robert P Miller, Sr
VP & Gen Mgr: R P Miller, Jr
Sec-Treas: Robert P Miller, Jr
Supt: G E Hilliard
Geol: D C Peacock
Elec Eng: Geo Lockwood
MINE, 11 mi NW of Burnet, surface graphite
Mine Frm: Pete Bible
Prod: 300 tons
280-TON FLOT MILL, at mine
Mill Frm: Tom McAllister
Assay: James Wright

SUSQUEHANNA-WESTERN, INC
777 Grant St, Denver 3, Colorado
Pres: Allen D Gray
VP & Treas: W H Hoadley
Purch Agt: P M Cheney
LUCKETT MINE, PO Box 217, Falls City; mine at Dewees ville, 10 mi W of Falls City, open pit, U_3O_8
Mine Supt: R B Schlosser
Prod: 750 tons
200-TON SOLVENT EXTRACTION MILL, Falls City
Mill Supt: P V Bethurum

THE TXL OIL CORP
3100 Fidelity Union Tower
1507 Pacific Ave, Dallas 1
Pres: George A Wilson
VP: W Z Burkhead
Sec-Treas: Denton B Wise
Mgr Mng: John S McNabb, Jr
NUMEROUS MINES under development, undergr, open pit, placer, potash, talc, Ag, Au, Pb, Zn, Be

TEJAS BARITE, INC
PO Box 13216, Houston 19
Pres: Donald E Graham
Gen Mgr: Pete Allen
GRINDING PLANT, 300 Harrington, Houston, Ba
Supt: Ewald Zwahr
GRINDING PLANT, Eagle Pass, Ba
Supt: John White

TEXAS GULF SULPHUR CO
75 E 45th St, New York 17, New York
Reg Ofc: 811 Rush Ave, Room 1803, Houston 2
VP: H W Strickland
H S Caven
Gen Mgr, Sulphur Oper: Ira E McKeever, Jr
FOUR MINES, Newgulf, Moss Bluff, Spindletop & Fannett, sulphur
(See NY, Utah)

U S GYPSUM CO
300 W Adams St, Chicago, Ill
MINE, Sweetwater, Nolan County, open pit, gypsum
Works Mgr: T H Kassner
MINE, New Braunfels, open pit, limestone
Works Mgr: D J George
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mich, Mont, Ohio, N Mex, NY, Okla, Utah, Va)

UTAH

AIRBORNE PROSPECTORS
Grand Junction, Colo
Agt: Wade Shupe, Moab
"A GROUP" MINE, Green river dist, Grand Co, U_3O_8

ALLIED MISSION OIL, INC
165 Broadway
New York, New York
MINE, U_3O_8

AMERICAN GILSONITE CO
Municipal Airport, PO Box 15, Salt Lake City
Pres: E F Goodner
VP-Prod Mgr: R E Nelson
Sec-Treas: E H Owen
BONANZA MINES, Bonanza, undergr, gilsonite
Mine Supt: Paul Borden
Mine Frm: L F Williams
Mine Eng: R F Dewey

Prod: 1,000 tons
(See Colo)

AMERICAN SMELT & REFINING CO
700 Crandall Bldg
Salt Lake City 1,
WESTERN SMELTING DEPARTMENT
Gen Mgr: W G Rouillard
Office Mgr: L K Nicholson, Jr
WESTERN MINING DEPT,
600 Crandall Bldg
Mgr: J F Frost
Senior Geol: W P Hewitt
Ch Geophys: R J Lacy
Mtg Eng: Norman Weiss
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, Neb, NJ, N Mex, NY, Tex, Wash)

AMERICAN STAR MNG CO
608 Dooly Bldg, Salt Lake City
Pres: Cecil Fitch
VP: Cecil Fitch, Jr
Sec-Treas: W W Watson
AMERICAN STAR MINE, Eureka, Ag, Au, Cu, Pb

AMERICAN ZINC, LEAD & SMELTING CO
1600 Paul Brown Bldg
St Louis 1, Mo
Western Geol: Hiram F Mills
2962 E 3135 South,
Salt Lake City
(See Ariz, Ill, Mo, N Mex, Ohio, Okla, Tenn, Tex, Wash, Wisc)

AMPET CORP
523 Colorado Bldg
Denver 2
Pres: R A Gus Davis
VP: Robert J Paul
Sec-Treas: A O Brehmer
VANADIUM KING 1 & 5,
Temple Mt, Emery Co,
undergr, U_3O_8 V_2O_5
Gen Mgr: R A Davis
Mine Supt: Jay Gillies
MILL, Green River
(See Ariz)

ANACONDA COMPANY, THE-CARR FORK OPERATION
c/o International Smelt & Ref Co, Kearns Bldg,
Salt Lake City
MINE, Bingham dist, Salt Lake Co
Ch Geol: Roland Mulchay
Ch Clerk: L J Eliason
(See Calif, Mont, Nev, N Mex, NY)

ANDERSON BROTHERS MINING CONTRACTORS
Box 216, Moab
Part: James E Anderson
James L Anderson
DELTA MINE (lease), open pit, U_3O_8
Gen Mgr: James E Anderson
Asst Gen Mgr: James L Anderson
Gen Supt: Fred Neisler
Prod: 50 tons

ANSCHUTZ DRILLING CO, INC
1411 Mile High Center
Bldg, Denver, Colo
Pres: A M Alloway
VP: J H Cazier
JIMBO BOB MINE, 20 mi NE of Monticello, undergr, U_3O_8, V_2O_5
Mgr Mng: J H Cazier
Geol: Louis Gaz
Mine Supt: Elbert Short
Prod: 20 tons
(See Colo, Wyo)

ARENTZ MNG VENTURE
870 1st Security Bldg
Salt Lake City
Pres: Samuel S Arentz
Treas: Frank H Anderson
(See Ore)

BARLOW, WILLIAM S
Dove Creek, Colo
MINE, San Juan Co, U_3O_8
(See Colo)

BEAR CREEK MNG CO
407 Surety Life Bldg
1935 S Main St, Salt Lake City 15,
Pres: C H Burgess
(See Alaska, NY & Kennecott Copper Corp, Ariz)

BESTWALL GYPSUM CO
120 E Lancaster Ave
Ardmore, Pa
GYPSUM MINE, Sigurd
(See Iowa, Kans, Mich, NY, Pa, Tex)

BINGHAM EMPIRE MNG CO
Box 83 Foothill St
Salt Lake City 8,
VP: Philip S Knight
Sec-Treas-Gen Mgr: Richard Knight
BINGHAM EMPIRE MNG CO MINE, Bingham Canyon, undergr, Cu
No Prod

BLUE CREEK MNG CO
PO Box 1649, Grand Junction, Colorado
Pres: E L Hess
Sec: D G Son
BLACK HAT URANIUM MINE, Paradox dist, undergr, U_3O_8 V_2O_5

BONNEVILLE, LTD
540 W 7th South St
Salt Lake City 1
Pres: Q A Shaw, Jr
VP: R D MacDonald
Sec-Treas: G B C Mathison
Purch Agt: W R Thomas
MINE, Wendover, KCl
Gen Mgr: J V Ecton
Gen Supt: J R Wiley
Metl: P Hadseriga
Chem: C Andrew, H C Ballard
1,000-TON FLOT MILL

BOYLES BROS DRILLING CO
1624 Pioneer Rd
Salt Lake City
Pres: R T Goldsworthy
VP: H L Baker
Sec: A F Goldsworthy
Treas: V L Stevens
Purch Agt: A P Tucker
Compt: E D Haddon
(See N Mex)

BULLION MONARCH MINING CO
Idaho Falls, Idaho
Or c/o VANADIUM CORP OF AMERICA, 420 Lexington Ave, New York 17, New York
FARMER JOHN MINE, Marysvale dist, Piute Co, U_3O_8
(Leased to VANADIUM CORP OF AMERICA)

BUTTE GOLD MINES INC
904 Walker Bank Bldg,
Salt Lake City
Pres: Clark L Wilson
VP: Gale Hansen
Sec: Robert L Creamer
Treas-Purch Agt: Carl D Harper
(See Mont)

CARDIFF INDUSTRIES INC
3975 E 58th Ave
Box 9006, Denver 16
Colo
Pres: E M Stone
VP: H S Dickson
Sec-Treas: James B McDonald
Purch Agt: Cloyd H Nelson
CARDIFF MINE, Box 2486, Salt Lake City 10, undergr, Pb, Zn, Ag
Gen Mgr: E M Stone
Asst Gen Mgr: H S Dickson
Gen Supt: Cloyd H Nelson
Geol & Mine Eng: J J Beeson

CARIBOU MNG CO
740 McClelland Ave
Salt Lake City 2,
MINES, San Juan Co, U_3O_8

CENTRAL OIL & MINING CORP
407 Kearns Bldg,
Salt Lake City 1,
Pres: W D Nebeker
VP: Ralph J Hafen
Sec-Treas, Purch Agt & Gen Mgr: Maxwell Bentley
DELTA MINE, open pit, U_3O_8
Gen Mgr: James E Anderson
Asst Gen Mgr: James L Anderson
Prod: 100 tons

CENTENNIAL DEVEL CO
Eureka
Pres: Harold B Spencer
VP: James Quigley
Sec: Robert E Watt
Purch Agt: Frank McCabe
Ch Eng: E S McIntyre
(See Ariz, N Mex)

CHIEF CONSOL MNG CO
608 Dooly Bldg
Salt Lake City
Pres & Gen Mgr: Cecil Fitch, Jr
VP & Sec-Treas: W W Watson
CHIEF NO 1, Eureka, undergr, Zn, Pb, Ag, Au
No Prod

CLIFF DEVEL & EXPLOR CORP
4643 Hyland Dr
Salt Lake City
Pres & Gen Mgr: W C Dunham
Actg VP: Earl Kidd
Sec-Treas: Doris T Dunham
SHOWER'S MINE, Silver City, undergr, Cu, Pb, Zn, Au
THE WELL, Rush Valley, undergr, Pb, Cu, Ag, Au
Geol: W C Dunham
No Prod

CLIMAX URANIUM CO (Subsid of AMERICAN METAL CLIMAX)
PO Box 1901
Grand Junction, Colo
Pres: Frank Coolbaugh
VP-Gen Mgr: A M Mastrovich
Consit: E J Duggan
Mgr, Mines: T E McCandless
Ch Geol: Philip Donnerstag
Asst Treas: A R Eikenbary
Asst Sec: J D Carnahan
MINERAL POLAR #22,
CACTUS RAT, CANE CREEK MINES, Grand Co, Utah
U_3O_8 prod & development
MORENO SCHOOL SECTION, San Juan County
(See Ariz, Colo, NY)

COLORADO CONSOL MINES CO
1114 Walker Bank Bldg
Salt Lake City 11,
Pres: H E Raddatz
VP: W W Romney
Sec: Glen Hardy
Treas: M D Paine
COLORADO CONSOLIDATED MINE, (Lessees), Dividend, 2 mi SE of Eureka, undergr
Pb, Au, Ag, Cu
No Prod

COLORADO FUEL & IRON CORP
Pueblo, Colo
Pres: A F Franz
VP: J J Martin
Sec: D C McGrew
Gen Mgr: R R Williams, Jr
Purch Agt: L C Rose
BLOWOUT, COMSTOCK & DUNCAN MINES, Cedar City, open pit, Fe
Res Eng: John Robertson, Jr
Prod: 3,000 tons
(See Colo, Wyo)

COLUMBIA IRON MNG CO (Subsid U S STEEL CORP)
120 Montgomery St
San Francisco 6, Calif
MINES, Iron Mtn & Desert Mound, 20 mi W of Cedar City, surface, Fe
Gen Supt: G D MacDonald
Mine Eng: J D Quinn
CRUSHING & SCREENING PLANTS, Desert Mound & Iron Mtn
(See U S Steel Corp, Ala, Calif, Minn, Pa, Tenn, Wyo)

COL-U-MEX URANIUM CORP
1370 S 3rd West,
Salt Lake City
Pres: Nels Stalheim
Sec: Donald Peters
DOROTHY MAY MINE, Big Indian Mng dist, San Juan Co, undergr

COMBINED METALS REDUCTION CO
Box 150, Salt Lake City
Pres & Gen Mgr: E H Snyder
VP: E H Snyder, Jr
W H Kelsey
Sec: C M Christensen
Treas: A C Merrill
Purch Agt: E G Black
Gen Mgr: Paul Gemmill
BAUER PLANT OPRS, Stockton, undergr, Pb, Zn
Gen Supt: I C Droubay
Research Met: Corwin Likens
Mech Eng: Malcolm L Ord
Mill Supt: Winford Hector
Met: Rex Hayes
Office Mgr: Frank Andrews
1,500-TON FLOT MILL, Bauer Plant
No Prod
(See Nev)

CONSOL EUREKA MNG CO
217 Kearns Bldg
Salt Lake City 1
Pres: James E Hogle
VP: J C Johnson
Sec-Treas: L J Lerwill
Gen Mgr & Purch Agt: Sherman B Hinckley
(See Nev)

CUPRIC MINES CO
39 Exchange Place
Room 20, Salt Lake City 11,
Sec-Treas: David H Bullough
NEWHOUSE-CACTUS MINE, San Francisco dist, Beaver County, open pit, Cu
Under devel

DELTA MNG CO, INC
2229 South Kentucky Ave
Evansville, Indiana
Sec-Treas: Carl F Kuebler
Agt: E J Hall, PO Box 51, Monticello
MAYBE MINE, Red & Fry Canyons, San Juan Co, U_3O_8

DRAGON CONSOL MNG CO
c/o L J Eliason,
International Smelting & Refining Co, RFD #1,
Tooele
Pres: Roland B Mulchay
VP: Richard Knight
Sec-Treas: L J Eliason
Purch Agt: G R Freebairn
DRAGON MINE, 4 mi S of Eureka, undergr, surface, halloysite clay, Au
Geol: R B Mulchay
(Lessee, Filtrol, Inc, Salt Lake City)

EAGLE & BLUE BELL MNG CO
608 Dooly Bldg
Salt Lake City
Pres: Cecil Fitch, Jr
VP: W W Watson
Sec-Treas: Audrey L Christensen
EAGLE & BLUE BELL MINES, Eureka
Pb, Zn, Ag, Au
No Prod

ESCALANTE MNG VENTURE
870 First Security Bldg
Salt Lake City
Own: The Chief Consolidated Mng Co, Armet Co
Treas: Frank H Anderson
MINE, Enterprise, undergr, Ag, Pb
Under devel

EUREKA LILLY CONS MNG CO
1114 Walker Bank Bldg
Salt Lake City 11,
Pres: H E Raddatz
VP: W W Romney
Sec: Glen Hardy
Treas: M D Paine
EUREKA LILLY MINE, Dividend, undergr, Au, Ag, Cu, Pb
No Prod

EUREKA STANDARD CONSOL MNG CO
1114 Walker Bank Bldg
Salt Lake City
Pres: H E Raddatz
VP: Harriet D Travis
Sec: Glen Hardy
Treas-Purch Agt: M D Paine
EUREKA STANDARD & DUMP MINES, Utah Co, Au
No Prod

EVEN-ODDS, INC
Monticello
Pres: J L Menlove
304 E 1250 No,
Bountiful
MINE, Montezuma Canyon, San Juan Co, U_3O_8

FEDERAL RESOURCES CORP
1370 S 3rd W St
Salt Lake City
Chmn of Bd: Nels W Stalheim
Pres: R W Neyman
VP: Bruce W Odlum
Sec-Treas: Donald V Peters
Purch Agt: J A Grive
MINES, U_3O_8, Ag, Pb, Zn, Cu
Gen Supt: R Messerly
Gh Eng-Geol: A B Newman
Gen Mill Supt: Arthur W Griffith
Under devel
(See Idaho)

FOUR CORNERS OIL & MINERALS CO
Rm 220, 1700 Broadway
Denver 2, Colo
Pres: Donuil M Hillis
VP: George D Fehr
Sec: Thomas J Murphy
Treas: Henry B Nadorff
VARIOUS MINES, Green River, undergr, U_3O_8
Mine Supt: Frank Hovis
(See Colo)

FRANCIS, LYLE G
PO Box 204, Moab
MINE, U_3O_8

FRISCO SILVER LEAD MNG CO
39 Exchange Place
Salt Lake City
Pres: Robert A Hunt
Sec: David H Bullough
MINE, 25 mi W of Milford, undergr
No Prod

GARFIELD CHEMICAL & MFG CORP
610 Kearns Bldg, Box 2086
Salt Lake City 10
Pres: J P O'Keefe
VP: R J McNally
Asst Sec-Treas: Paul B Jessup
Treas: O C Madsen
Purch Agt: T B Rees
(Managed by Kennecott Copper Corp)
UTAH SMELTER, Garfield
1,000-TON sulfuric acid plant

GLENNY-CUTLER MNG CO
704 Newhouse Bldg,
Salt Lake City
WHITE CANYON CLAIMS, San Juan Co, U_3O_8
ORA & LITTLE SCOTTY, Wayne Co, U_3O_8
VANADIUM KING CLAIMS, Emery Co, U_3O_8

GRAMLICH MINERALS, INC
Box 435, Moab
Pres & Gen Mgr: J W Gramlich, Sr
VP & Asst Gen Mgr: J W Gramlich, Jr
Sec-Treas & Gen Supt: Philip F Gramlich
BLUE JAY & SAN JUAN MINES, undergr, U_3O_8 V_2O_5
Geol: Duff Ebbley
Mine Eng: Hub Newell
Under devel

GREAT WESTERN MINES CO
Box 63, Foothill Stn
Salt Lake City 8,
Pres & Gen Mgr: Richard Knight
VP: W S Brimhall
Sec-Treas: Philip S Knight
110 CLAIMS, Snake Creek dist, American Fork Mng dist, open pit, undergr, Cu, Au, Ag, Pb
(Under lease to Utah Constr Co, Calif)
Under Devel

GREEN RIVER OIL & URANIUM CO
26 W Broadway
Salt Lake City
Pres: Fallas M Kelly
Sec-Treas-Gen Mgr: Austin B Smith
(See Colo, Wyo)

HECLA MNG CO
Moab
Pres: L J Randall
Gen Mgr: W H Love
RADON MINE, Big Indian dist, near Moab, undergr, U_3O_8
Mine Supt: Philip Lindstrom
Mine Frm: Grant Eslick
Mine Eng: Vernon Davis
Prod: 250 tons
(See Idaho)

HIDDEN SPLENDOR MNG CO, THE
PO Box 2306, Salt Lake City 10
Chmn of Bd: David A Stretch
Pres: A Payne Kibbe
VP-Gen Mgr: Dale I Hayes
Sec-Treas: Walter G Clinchy
Asst Sec: Daniel Demerest
Asst Treas: John R Gough
Purch Agt: Jack E Hopfenbeck
Staff Eng: R L Brittain
Staff Geol: Edwin T Wood
Gen Supt: S E Craig
Asst Gen Supt: J M Newman
Supt of Mines: John R Mullen
Geol: Wm B Loring, Harold W Blakely
FAR WEST MINE, Big Indian Wash, San Juan Co undergr, U_3O_8
Mine Supt: John R Mullen
COLUMBIA SHAFT, Big Indian dist, undergr, U_3O_8
Mine Supt: Claude L Sage
IKE SHAFT, Moab, undergr, U_3O_8
Mine Supt: Albert Edwards
ULA MINE, Red Canyon dist, San Juan Co, Cu, U_3O_8
Mine Supt: Russell J Christie
(See N Mex, Wyo)

HOMESTAKE MNG CO UTAH DIVISION
100 Bush St, San Francisco California
NORTH ALICE MINE, Big Indian dist, San Juan Co, undergr, U_3O_8
Gen Mgr: Gordon M Miner
Gen Supt: Edw F Jacobson, Jr
Asst to Pres: Paul C Henshaw
Mine Frm: Frank Beggie
Eng: Walter Weid
Prod: 275 tons
(See Calif, N Mex, SD, Wyo)

HORN SILVER MINES CO
39 Exchange Place
Salt Lake City
Pres: D M Draper, Sr
VP: Robert A Hunt
Sec-Treas: D H Bullough
HORN SILVER MINE, Milford Au, Ag, Pb, Zn
No Prod

HUNT, KAY
Hanksville
BLITZ GROUP, undergr & open pit, U_3O_8
Gen Mgr: Maurice Carpenter
Prod: 5 tons
TRACHYTE GROUP
Gen Mgr: L McDougall
Under devel

IBEX GOLD MINING CO
Box 63, Foothill Stn
Salt Lake City 8
VP: Philip S Knight
Sec-Treas & Gen Mgr: Richard Knight
IBEX MINE, (Leased) near Delta, in Drum Mt dist, undergr, Cu, Au, Ag
No Prod

INDEX-DALEY MINES CO
114 1/2 N Main St
Salt Lake City 16
Pres & Purch Agt: Charles S Woodward
VP: Reginold W Edmunds
Sec-Treas: Williamina J Orton
INDEX MINE, Spruce Mt, Nev
CREOLE MINE, PO Box 486, Milford; mine at Minersville, undergr, Cu, Zn, Bi, Au, Ag
Gen Mgr: Charles S Woodward
Gen Supt: George A Rich
Prod: 50 tons
Under devel

INDUSTRIES & MINES INC
50 Broad St, New York 4, New York
DEL MONTE, DAISY JUNE, CONGRESS, & EAGLE MINES, Henry Mts, undergr, & surface, U_3O_8, V_2O_5, Au, Cb, Ta
Gen Mgr: James M Knapp
Asst Gen Mgr: Edward Honska
Geol: Stuart St Clair
Mech Eng: Wm Kessen
(See NY)

INTERMOUNTAIN EXPLORATION CO
PO Box 398, St George
Pres: Richard V Wyman
Sec: Anne F Wyman
(See Ariz)

INTERNATIONAL OIL & METALS CORP
512 E Second S
Salt Lake City
Pres: Gordon C Holt
VP: Louis H Seagrave
Sec: Judith F Whitmer
Treas: Devearl Dimond
DIVIDE MINE, Big Indian dist, San Juan Co, undergr, U_3O_8
Prod: 10, 000 tons yrly

INTERNATIONAL SMELTING & REFINING CO
LEAD-ZINC SMELTER & CONC, Tooele
Mgr: W J McKenna
Gen Supt: E W Steinbach
Pl Eng: Earl O House
Pers & Safety: T K Voyer
SALT LAKE CITY OFC, 815 Kearns Bldg, Salt Lake City
Asst to Mgr: G A Burt
Counsel: Robert G Dwyer
(See Ariz, NY, NJ)

ISBELL CONST CO
Box 2351, Reno, Nev
HAPPY JACK URANIUM MINE, Fry Canyon, contract mng for Texas-Zinc Minerals Corp
Supt: Dick Strand
Under devel
(See Ariz, Idaho, Nev, Wash)

JOLLY JACK URANIUM
623 Judge Bldg
Salt Lake City
DEER FLAT MINE, White Canyon area, Big Indian dist & Garfield Co, undergr U_3O_8
Gen Mgr: Yuba Devel Corp
Mine Supt: Vernon R Aiken
Under devel
(See Calif)

KENNECOTT COPPER CORP
PO Box 1650, Salt Lake City
Pres: C R Cox
VP: F R Milliken
Sec: P H Jessup
Treas: James R Simpson
Purch Agt: L W Shelton
Asst to Pres: John D East
Gen Mgr, West Mng Div: C D Michaelson
UTAH COPPER DIVISION
Gen Mgr: J P O'Keefe
Gen Supt, Mng & Mlg: R F Gough
Gen Supt, Smelting & Ref: Wayne Burt
Geol (Mine): F H Howell
Mine Supt: V S Barlow
Maint Frm: J A Norden
Mine Eng: J L McKellar
MINE, Bingham Canyon, open pit, Cu, Mo, Au, Ag, Se
Prod: 90, 000 tons
MAGNA & ARTHUR FLOT MILLS
Mill Supt: P H Ensign
Frm (Magna): T J Hubbard
Frm (Arthur): Neil Plummer
Ch Anal Chem: V A Fraser
Cap: 45, 000 tons Cu ore
REVERB SMELTER & REF, Magna
Supt: Ray Thompson
Output: 142, 352 tons Cu yrly

KENO MNG & MLG CO
Box 63, Foothill Stn
Salt Lake City 8
VP: Philip S Knight
Sec-Treas & Gen Mgr: Richard Knight
IBEX MINE, (Leased), Detroit Mng Dist, north end of Mineral Mt Range, undergr, Ag, Pb
No Prod

KERN COUNTY LAND COMPANY
520 East 4th South
Salt Lake City 2
Consulting Geol: Sidney S Alderman, Jr
Mgr, Minerals Dept: Wm T Griswold
(See Ariz, Calif, Idaho)

KIN'EL URANIUM CORP
3329 1/2 N Jackson Ave, So San Gabriel, California
Pres: Clarence King
VP: Soren Nelson
Sec-Treas: D M King
BLUE GOOSE #1 and #2, Indian Creek, undergr, U_3O_8
No Prod

LA PLATA GOLD CORP
1747 Park St, Salt Lake City
Pres: John B Hopkins
VP: C B Johnson
Sec: M W Hopkins
(See Colo)

LA SAL MNG & DEVEL CO
Box 563, Moab
LA SAL MINE, Big Indian dist, San Juan Co, undergr, U_3O_8
Mine Supt: Gordon Miner
Asst Mine Supt: E F Jacobson, Jr
Mine Frm: Donald Weierman
Mine Eng: Walt Weid
Prod: 200 tons

LARSEN INDUSTRIES, INC
Box 367, Murray
Pres: Vincent A Duff
VP: Paul B Cardon
Sec-Treas: David J Stone
Purch Agt: George E Shuey
BELL HILL MINE, Box 351, Delta, Juab Co, undergr, fluorspar
Gen Mgr: W Morris Trover
Gen Supt: Harold Stephensen
50-TON FLOT MILL, Delta
Mill Supt: Stanley Bradfield

LONE STAR MNG & DEVEL CORP
235 Korber Bldg, Albuquerque, N Mex
NORTH WASH MINE #1, Garfield Co, U_3O_8
(See N Mex)

MCFARLAND & HULLINGER
Box 238, Tooele
Parts: F G McFarland
S R Hullinger
(See Ariz)

MECCA MNG CO
705 Newhouse Bldg
Salt Lake City
Sec: R A Glenny
MINE, Tooele Co, Pb, Zn
No Prod

MESA MNG & DRILLING CO
Blanding
Part: Calvin Black, Wendle Black, James D Terrell
MARKEY & MAYDAY MINES, undergr, U_3O_8, Cu
Prod: 50 tons

MICRO COPPER CORP
Marshall Court, Moab
Pres: Richard N Mohler
Sec-Treas: Ellis R Cook, Jr
(See Colo)

MINERALS ENGINEERING COMPANY
801 Fourth Ave
Grand Junction, Colo
Pres: R G Sullivan
VP: Robert W Price
Sec: Glen P Wilson
Treas: Richard Warren
Purch Agt: Edson Foster
CALVERT CREEK MINE, Mont
MILL, Mont
SMELTER, Salt Lake City
Supt: Howard Wiswell
Asst Supt: Harry Russell
Output: 430, 000 lbs APT yrly
(See Colo, Mont)

MINERALS EXPLOR & DEVELOPMENT CORP
1772-22nd St, Ogden
3510 Lee St, Wheatridge Colo
Pres: Vel Klein
VP: Fred T Lopez
Sec-Treas: Cliff Crossan
MINE, Ogden, open pit, phosphate, halloysite clay, talc
Gen Mgr: Fred T Lopen
Mine Supt: Homer Temres
Under devel
(See Colo)

MNG BUREAU OF ANALYSIS
Box 867, Cortez, Colo
Pres: George R Grandbouche
BELL MINE, Fry Canyon undergr, U_3O_8, Cu
Gen Mgr: G Grandbouche
(See Colo)

MYSTERY-SNIFFNER MINES, INC
Beaver
Pres: W R O'Keefe
VP: L E Heathman
Sec-Treas: B L Flood
Purch Agt: R E Lee
MYSTERY-SNIFFNER MINES, 16 mi NE of Beaver, undergr, U_3O_8
Gen Mgr: W R O'Keefe
Asst Mgr: L Hollingshead
Mine Eng & Geol: Edwin Poehlmann
Prod: 40 tons
40-TON MILL, Beaver

NATIONAL TREASURE MINES, INC
1776 E 5600 So,
Salt Lake City 17
Pres: Paul McFarland
VP: Vera Young
Sec-Treas: Lee Henroid
Purch Agt: Paul McFarland
NATIONAL TREASURE MINE, Stockton, undergr, Ag, Pb, Zn, Cu, Ag
Gen Mgr: Paul McFarland
Asst Gen Mgr: Rae McFarland
Gen Supt: Guy Murphy
Geol: Frank Young
Mech Eng: Paul Green
Prod: 50 tons

NEW PARK MINING CO
901 Walker Bank Bldg,
Salt Lake City
Pres: W H H Cranmer
Exec VP: Robert L Cranmer
Sec-Purch Agt: Carl D Harper
Treas: R C Wilson
NEW PARK "MAYFLOWER" MINE, undergr, An, Pb, Ag, Au, Cu
Gen Mgr: W H H Cranmer
Asst Gen Mgr: Robert L Cranmer
Gen Supt: Gail Hansen
Geol: Robert Archer
Explor Geol: Robert Weise, Jr
Met: Harry Welch
Mine Eng: James V Muth
Prod: 150 tons

NORTH BINGHAM CONSOL MNG CO
PO Box 63, Foothill Stn
Salt Lake City
VP: Philip S Knight
Sec-Treas & Gen Mgr: Richard Knight
No Prod

NORTH WESTERN MNG & EXPL CORP
12822 3rd S,
Seattle 88, Wash
Pres: Albert L Worlman
VP: Lyman Battey
Sec-Treas: James E Williams
CONSOLIDATED MINE, Emery Co, undergr, V_2O_5, U_3O_8
(Leased to Abel B Aragon-Box Holder, Price)
No Prod
(See Mont, Wash)

PAINTED DESERT URANIUM & OIL CO, INC
W 1023 First
Spokane 4, Wash
Pres: Willard Parsons
VP: H R Parsons
Sec-Treas: W M Fredericks
Dir: J B Parsons
BIG CHANCE GROUP & GUNGA-DREAM GROUP, Grand Co, U_3O_8
DIXIE GROUP, San Juan Co, U_3O_8

PARK CITY CONS MINES CO
438 S Main St, Salt Lake City
Pres & Treas: Carl Stehle
VP: J L Chadwick
Sec: H Corkey, Jr
PARK CITY MINE, Park City, undergr, Ag, Pb
Gen Mgr: F T Stehle
No Prod
(See Calif, Colo)

PLUTUS MNG CO
608 Dooly Bldg
Salt Lake City
Pres: Cecil Fitch
VP & Gen Mgr: Cecil Fitch, Jr
Sec & Purch Agt: W W Watson
PLUTUS MINE, Eureka, undergr, Ag, Pb, Au
No Prod

RAMSHORN MINES CO
333 Felt Bldg
Salt Lake City
Pres: W W Murray
Sec & Mgr: L Eagar
Agent: H M Earl
(See Idaho)

RARE METALS CORP OF AMERICA (Affiliate of EL PASO NATURAL GAS CO)
6th Floor, El Paso Natural Gas Bldg, 315 E 2nd South,
Salt Lake City 11,
Pres: C L Perkins (Box 1492, El Paso, Tex)
VP: M H Kline
Sec-Treas: Virgil Rittmann
Asst Sec: Anne Kidd
Ch Eng: J R Reynolds
Ch Geol: L A Hansen
Supr, Land Dept: R O Baldwin
Ch Mng Eng: E J Carlson
Ch Chem: R Kronstadt
Ch Met: S M Runke
Purch Agt: Claude J Jenkins
(See Ariz, Idaho, N Mex)

RICO ARGENTINE MINING CO
217 Kearns Bldg
Salt Lake City
Pres & Gen Mgr: Sherman B Hickley
VP J C Johnson
Sec: L Lerwill
Treas: B B Hall
(See Colo)

RIMLEDGE URANIUM & MINING CORP
PO Box 282, Glenwood Springs, Colo
Pres: W E McCormick
VP: F A McCormick
Sec: K Balcomb
Treas: J Hooker
LOUISE MINE, San Juan Co, undergr, U_3O_8
Gen Mgr: W E McCormick
Prod: 120 tons
Under devel

ROBECK, RAYMOND C
(non operating partner)
535 Orchard Ave, Grand Junction, Colo
CLOUDY DAY AND JOHN MINES, Elk Ridge, San Juan County, U_3O_8
(See Colo)

SAN FRANCISCO CHEMICAL CO
Dr F, Montpelier, Idaho
ARICKEREE MINE, NE of Randolph, undergr, phosphate rock
Gen Supt: Charles C Stephens
MINE, Vernal, open pit, phosphate rock
Gen Mgr: D L King
Asst Gen Mgr: Robert K Barcus
Gen Supt: Kenneth Hill
Mine Frm: Duncan L King, Jr
Under devel
600-TON FLOT MILL, 10 mi NW of Vernal

SECURITY URANIUM & OIL, INC
Box 841, Moab
Pres: W U January
Exec VP: E C Funk, Sr
VP: M B Peterson
Sec & Treas: A C January
JEAN MINE, San Juan Co, undergr, U_3O_8, V_2O_5, Cu

SENDEX MNG & DEVEL CORP
PO Box 692, Provo
MINE

SHASTA MINERALS & CHEMICAL COMPANY
1406 Walker Bank Bldg,
Salt Lake City
Pres: K L Stoker
VP: Harper Hunsaker
Sec: Nancy Hardman
Treas & Purch Agt: Reed L Reeve
(See Calif)

SHATTUCK DENN CO (WHOLLY OWNED SUBSID OF SHATTUCK DENN MNG CORP)
317 Main, Grand Junction,

Colorado
Pres: Thomas Bardon
VP & Mgr: T W Newell
Sec: John A Moss
Purch Agt & Ofc Mgr: J D Hill
Eng & Geol: C W Appelin
BARDON MINE, Box 246, Moab, undergr, U_3O_8, V_2O_5
Gen Mgr: T W Newell
Gen Supt-Mine Supt: Frank Garrett
Mine Frm: Leo Zitnik
No Prod
NEWELL MINE, PO Box 176, Green River
Gen Supt: F W Garrett
Mine Frm: R L Zitnik
Prod: 300 tons
(See Ariz, Colo, NY)

SHRIVER, ROBERT S
Box 524, Blanding
REBEL MINE, White Canyon Mng dist, Elk Ridge area, San Juan County, undergr, U_3O_8
Prod: 20 tons
300-TON MILL, Tuba City, Ariz
Mill Supt: Mr Gommel

SILVER KING WESTERN MNG & MLG CO
c/o J W Gallivan
1017 Kearns Bldg, Salt Lake City
MINE, Utah Co, Ag

SIOUX MINES CO
1114 Walker Bank Bldg
Salt Lake City
Pres: H E Raddatz
VP: Harriet D Travis
Treas: M D Paine
Auditor: Glen Hardy
SIOUX MINE, Tintic dist, Utah Co, Au, Ag, Cu
(Lessee operation)
No Prod

STANDARD COL-U-MEX JOINT VENTURE
(Oper by Standard Metals Corp, 264 S 4th East, Moab)
DOROTHY MAY MINE, Big Indian Dist, U_3O_8

STANDARD METALS CORP, (FORMERLY STANDARD URANIUM CORP)
264 S 4th East, Moab
Pres: Wm R McCormick
VP: Aaron Holman
Sec-Treas: I N Brozan
Purch Agt: Jess W Bartlett
Ofc Mgr: J M Hansen
BIG BUCK MINE, Big Indian dist, San Juan Co, undergr, U_3O_8, V_2O_5
Gen Mgr: Wm R McCormick
Geol: R R Ward
Mech Eng: E R Carnahan
Mine Supt: David E Axtell
Prod: 300 tons
(See Colo)

STAR DUST MINES, INC
No 4, 283 E South Temple
Salt Lake City
Pres & Gen Mgr: Fred Cook
VP: Leslie J Battey
Sec-Treas: W M Nance
Purch Agt: M V Cook
STAR DUST MINE, Gold Hill, undergr, surface, Ge, Ga, WO_3
Mine Supt: Fred Cook
Mgr: M White
Under devel
(See Nev)

SUNBURST, INC
1975 NW Everett St
Portland 9, Oregon
CANE SPRINGS CANYON MINE, near Moab, San Juan County, undergr
Gen Mgr: J C Young & Kay Critchlow
No Prod
(See Nev, Oregon)

SUNRISE MNG CO
Box 306, Monticello
SUNRISE, CLIMAX #2, MINES, White Canyon dist, San Juan Co, U_3O_8
LA MAR MINE, Wayne Co, U_3O_8
Prod: 1,600 tons per year

SWANSEA CONSOLIDATED MNG CO
Route 1, Tooele
Pres: R B Mulchay
VP: Richard Knight
Sec-Treas: L J Eliason
MINE, Juab Co, undergr, Cu, Pb, Au, Ag

TEXAS GULF SULPHUR CO
75 E 45th St, New York 17, New York
MINE & MILL, Moab, potash
Under devel
(See NY, Tex)

TEXAS-ZINC MINERALS CORP (Subsid of New Jersey Zinc Co)
1129 Colorado Ave
Grand Junction, Colo
HAPPY JACK MINE, White Canyon, undergr, U_3O_8
Mine Chf: A G Bernholdt, Jr
1,000-TON MILL, Mexican Hat
Mill Supt: K C Apland
(See Colo)

THORNBURG MNG CO
140 W Main St, Grand Junction, Colo
Own: Vance Thornburg
Bus Mgr: J T Tunnell
Ofc Mgr: C B Hadley
SHINARUMP & CORRAL MINES, PO Box 601, Moab, 12 mi NW of Moab, undergr, U_3O_8
Gen Supt: Edward G Johnson
Geol: R J Pursley
Mine Frm: Terral Wyers
Mine Eng: R J Pursley
Prod: 40 tons
Under devel
(See Colo)

TINTIC LEAD CO
39 Exchange Place
Salt Lake City
Pres: Robert A Hunt
VP: D M Draper, Sr
Sec-Treas: D H Bullough
MINE, Milford, open pit, Cu
(Leased)

TINTIC STANDARD MNG CO
1114 Walker Bank Bldg
Salt Lake City
Pres: H E Raddatz
VP: W W Romney
Treas & Gen Mgr: M D Paine
Sec: Glen Hardy
TINTIC STANDARD MINE, Dividend, undergr, Au, Ag, Cu, Pb, CaF_2
Under devel

TINTIC URANIUM CO
1114 Walker Bank Bldg
Salt Lake City
Pres: H E Raddatz
VP: L L Travis
Sec: Glen Hardy
Treas: M D Paine
PATS PROPERTY, PO Box 633, Moab, U_3O_8
Mine Supt: Ralph E Hawks
Prod: 7 tons

ULTIMO MNG CO
Box 5374, 408 N Pecos
Midland, Texas
DIANE #3 & SAND BAR #3 MINES, San Juan County, U_3O_8

U-NEVA URANIUM CORP
PO Box 1077, Salt Lake City 10
MINE, Emery Co, U_3O_8

UNION CARBIDE NUCLEAR CO, A DIV OF UNION CARBIDE CORP
PO Box 1049, Grand Junction, Colorado
Gen Mgr: J L Lake
Mgr, Mines: J F Emerson
Mgr, Plants: A C Sada
MINE, Green River, U_3O_8
MILL, Green River
Mill Supt: F H Larrison, Jr
(See Calif, Colo, Nev, NJ, Wyo)

UNITED MERCURY & OIL CORP
1391 E Glenoaks Blvd
Glendale 6, Calif
Pres: W Andrews
VP: E Davie
Sec: G Kihorny
Treas: H Swanson
MINE, near Milford, open pit, S
Gen Mgr: G Kihorny
Asst Gen Mgr: G Hogan
Mine Supt: Wm Rowell

UNITED PARK CITY MINES CO
826 Kearns Bldg
Salt Lake City
Pres: John M Wallace
VP & Gen Mgr: S K Droubay
Sec-Treas: E L Osika
UNITED PARK CITY MINES, Heber and Park City, undergr, Pb, Zn, Ag
Gen Supt: Walter J Dezell
Ch Geol & Engr: M P Barnes
Mech Eng: P O Reynolds
Met: Jack Wilson
Asst Mine Supt: Arthur Gray
Mine Frm: Marcus Jolley
Mine Eng: Harry Doppler
Prod: 350 tons

UNITED STATES GYPSUM CO
300 W Adams St
Chicago 6, Ill
MINE, Sigurd, open pit, gypsum
Works Mgr: J P Seaver
(See Calif, Colo, Conn, Ill, Ind, Iowa, Mass, Mich, Mont, Ohio, N Mex, NY, Okla, S Dak, Tex, Va)

U S LITHIUM CORP
1205 Walker Bank Bldg
Salt Lake City
Pres & Gen Mgr: Paul T Walton
VP & Sec: N G Morgan, Jr
(See Colo)

UNITED STATES SMELTING, REFINING, & MINING CO
WESTERN OPERATIONS
Newhouse Bldg, (PO Box 1980), Salt Lake City 10
VP & Gen Mgr, West Oper: Oscar A Glaeser
Asst to VP & Gen Mgr, West Oper: Benton Boyd
Ind Dev Dir: J M Ehrhorn
Ch Geol, West Oper: J M Conrow
Ch Mech Eng, West Oper: Boris Ashurkoff
UTAH OPERATIONS
U S & LARK MINES, Bingham dist, Pb, Zn, Cu
Gen Supt, US & Lark Mines: H H Wells
Mast Mech: Roy D Nealley
Ch Clerk: James A Coffey
Gen Mine Frm, US Sec: Neil Fresh
Gen Mining Frm, Lark Sec: A L Whitmore
MIDVALE FLOT MILL
Mgr: H L Johnson
Asst Mgr: Robert Johnson
Mill Supt: A A Nelson
Dir, Research Lab: Loran A Creglow
Ore Buyer: Blaine Watts
Ch Chem: F J Marshall
(See Alaska, Ariz, Mass, N Mex)

U S STEEL CORP COLUMBIA-GENEVA DIVISION
120 Montgomery St
San Francisco, Calif
VP-Oper: J D McCall
Mgr, Utah oper: L F Black
Gen Supt: H E Terry
BLAST FURNACE, Geneva, near Provo
(See Ala, Calif, Minn, Pa, Tenn)

URANIUM INDUSTRIES INC
523 Colorado Bldg
Denver, Colorado
Pres: K S Mittry
Sec-Treas: Alfred O Brehmer
VANADIUM KING MINES NOS 1, 2, 3, Temple Mt Dist, Emery Co, U_3O_8
(See Colo)

URANIUM REDUCTION CO
557 1st Security Bldg
Salt Lake City 11
Chmn: E H Snyder
Pres: Mitchell Melich
Exec VP: R A Young
VP: Charles A Steen
Secr: J S Katzin
Cost & Treas: John W Losse, Jr
Purch Agt: Rex Jones
MILL, Moab, acid & alkaline leach
VP & Gen Mgr: R F Hollis
Pl Supt: L A Painter
Asst Pl Supt: R W Unger
Ch Met: T Izzo
Pl Met: Buford Winn
Ch Chem: John Goff
FALSIE-BOWLEGS OPERATION, undergr, U_3O_8
Gen Mgr: Wm J Franklin
Purch Agt & Acct: Jay Sorensen
Prod: 250 tons

UTAH ALLOY ORES, INC
Room 302, 101 N High St
Columbus, Ohio
Sec: Simeon Nash
YELLOW CAT MINE, Yellow Cat dist, Grand Co, U_3O_8

UTAH CONSTRUCTION & MINING CO
100 Bush St, San Francisco
California
IRON SPRINGS MINE, PO Box 970, Cedar City, 11 mi W of Cedar City, open pit, Fe
Mgr, Iron & Coal Oper: E C DeMoss
Gen Mgr: R J Long
Ofc Mgr: E J Robison
Purch Agt: Mark Webster
Geol: E F Hanson
Chem: Albert Adams
Mine Supt: Y F Jones
Mine Engr: Donald Bellum
Prod: 4,000 tons
2,000-TON MAG SEP PLANT, at mine
Mill Supt: T Erspamer
(See Calif, Wyo)

UTAH QUARTZ & ROCK CO
PO Box 13, Bountiful
Pres: Grace Olmstead
VP: Paul Crossman
Sec-Treas: E B Hansen
Purch Agt: H W Hansen
MINES, undergr & open pit, Fe, Au, U_3O_8, V_2O_5, silica sand, quartz, clays, opal, gem stones
Gen Mgr: H W Hansen
Gen Supt: Paul Crossman
Mech Eng: Brandt Child
MILL, Salt Lake City
Mill Supt: George Robinson

UTEX EXPLOR CO
PO Box 487, Moab
Pres: Charles A Steen
VP: Wm R McCormick
Sec: Mitchell Melich
Treas: Maxine Steen Boyd
Exec Asst: Mary Hope Westbrook
Purch Agt: Margie Shafer
MI VIDA MINE, 41 mi SE of Moab, San Juan Co, undergr, U_3O_8
Mine Supt: Virgil Bilyeu
Asst Supt: Ted Barrett

VALLEY MNG, INC
Box 248, Moab
HORSEHOE, POSEY & RED CANYON, San Juan Co, U_3O_8
YELLOW BIRD MINE, Grand Co, U_3O_8

VANADIUM CORP OF AMERICA
420 Lexington Ave
New York 17, New York
Chmn of Bd: Wm C Kesley
Pres: G L Weissenburger
Sec: D A Shriver
Treas: L C Miller
Cost: J J Spollen
FREEDOM, PROSPECTOR, FARMER JOHN MINES, Piute Co, U_3O_8
Mine Supt: Clair Nielson
HYDE & DUCKETT GROUP, GARBUTT GROUP & URACOP MINE, San Juan Co, U_3O_8
(See Ariz, Colo, NY)
HENRY MTN GROUP, Garfield Co, U_3O_8, V_2O_5

VITRO CHEMICAL CO, DIV OF VITRO CORP OF AMERICA
600 West 33rd S,
Salt Lake City 15
Pres: W B Hall
VP: R C Cole
Sec: W H Denne
Treas: R T Ruder
Purch Agt: C A Theobold
Pl Mgr: J D Moore
Pers Dir: E B Robbins, Jr
Ore Buyer: R B Coleman
Pl Eng: T G Rukavina
660-TON HYDROMETALLURGICAL PLANT, Salt Lake City
Supt: M T Ellis
Asst Supt: R A Stainbrook
Plant Met: N N Schiff
Ch Chem: G W Hansen
(See Vitro Minerals Corp, NY, Wyo)

VITRO MINERALS CORP (SUBSID OF VITRO CORP OF AMERICA & ROCHESTER & PITTSBURGH COAL CO)
600 West 33rd S, Salt Lake City 15,
Gen Mgr: G H Young
Explor Mgr: C H Smith
TOPAZ MT MINES, Juab Co, Be
Geol: D M Snyder
Asst Geol: G M Park
Under devel
(See NY, Wyo; Vitro Chem Co, Utah)

WELCH MNG CO, INC
5426 Colbrook Ave
Lakewood, Calif
Pres: Lynn B Welch
VP: John R Mendizza
Treas: Robt P Coykendall
RED BONE #9 & LITTLE LIL MINES, Box 263, Green River, undergr, U_3O_8
Mine Supt: Warren H Thurston
Mine Frm: Gary Ekker

WEST PARK MINING CO
Box 486, Provo
Pres: J H Petersen
VP: Arvil H Scott
Sec-Treas & Purch Agt: Dean W Payne
WEST PARK MINE, 2 mi S of Brighton & 8 mi NW of Midway, undergr, Cu, Au, Ag
Gen Mgr: Arvil H Scott
Geol: E A Hewitt
Prod: 8 tons

WEST TOLEDO MINES CO
39 Exchange Place
Salt Lake City
Pres: Sid Spencer
Sec-Treas: David H Bullough
MINES, Alta, Little Cottonwood dist, undergr, Pb, Ag

WESTERN CORP (FORMERLY SHUMWAY URANIUM MNG CORP)
1935 S Main, Salt Lake City 15
SANDY #2 MINE, White Canyon dist, San Juan Co, U_3O_8

WESTERN GOLD & URANIUM INC
Box 95, Grand Canyon, Arizona
SILVER REEF MINE, Leeds, undergr, Ag, Cu, U_3O_8
No Prod
300-TON FLOT MILL, Silver Reef
(See Ariz, Colo)

WHELCHEL MINES CO
1019 Arthur St, Caldwell Idaho
Pres: Wm E Whelchel
VP: Ralph A Whelchel
Sec-Treas: Thressa M Whelchel
MEGATON & PLUTOMIC GROUP, U_3O_8, V_2O_5
Under devel
(See Nev, Idaho)

WOODMONT, INC (SUBSID OF CONT MATERIALS CORP)
820 S Ninth St,
PO Box 1550
Grand Junction, Colo
RATTLESNAKE MINE, Moab, undergr & open pit, U_3O_8, V_2O_5
Mine Supt: Maurice Brady
Prod: 100 tons

WRIGHT, CHESTER
Mack, Colo
MINE, U_3O_8

YANKEE CONSOL IDATED MNG CO
c/o International Smelt & Refining Co, RFD, Tooele
Pres: R B Mulchay
VP: W J McKenna
Sec-Treas: L J Eliason
MINE, Utah Co, undergr, Cu, Pb, Zn, Au

YUBA DEVELOPMENT CORP
1129 Colorado Ave, Grand Junction, Colo
Pres. J L McGaro
VP: F J Maloit
Sec: A H Sy
Treas: L J Boe
Purch Agt & Cont: Troy E Wade
HIDEOUT AND OTHER MINES, Fry Canyon, San Juan Co, undergr, U_3O_8
Gen Mgr: F J Maloit
Gen Supt & Mine Supt: Ludwig W Koch
Geol: Louis P Gaggini
Mine Frm: Leamon May
Prod: 150 tons
(See Colo)

VERMONT

EASTERN MAGNESIA TALC CO, INC
Baldwin Ave
South Burlington
Pres: E W Magnus
VP & Chmn of Bd: J H Patrick
VP & Gen Mgr: W W Magnus
Treas: R F Patrick
Gen Supt: V A Backels
NO 3 MINE, Hammondsville open pit
Prod: 80 tons
80-TON DRY GRINDING MILL, NO 3, Gassetts
Mine & Mill Supt: W A Dezaine
NO 4 MINE, 5 1/2 mi N of Johnson, undergr, talc
Mine & Mill Supt: R W Perkins
Mine Frm: Cliff Allen
Prod: 200 tons
100-TON FLOT-DRY GRINDING MILL
Mill Frm: Ken Stewart

RUBEROID CO, THE
500 Fifth Avenue, New York, New York
Pres: E J O'Leary
Sec: O A Maggia
VERMONT ASBESTOS MINE
Hyde Park mine at Lowell, open pit, asbestos fibers
Gen Mgr: I E Matthews
Asst Gen Mgr: W M Page
Geol: L Jordon
Mech Eng: E E Lanphere
Mine Supt: I M Potter
Asst Mine Supt: C Mason
Mine Eng: R K White
3,000-TON GRAV MILL, Lowell
Mill Supt: C C White
Asst Mill Supt: R C Wescomb
(See NY)

VERMONT KAOLIN CORP
Rd #2, Bristol
Pres: R B Thurber
Sec: A P Feen
Treas: D W Bostwick
ELECTRA MINE, Monkton, China clay, kaolin, silica, open pit
Gen Mgr: G B Guillotte
Gen Supt: L E English
Prod: 250 tons
250-TON AIR FLOT MILL

VERMONT TALC CO
Chester
Pres: T A Yager
Sec. Giles Blague
MINE, undergr, talc
Mine Supt: Frederick De Zaine
MILL, Chester

VIRGINIA

ALBERENE STONE CORP OF VA
Schuyler
MINE, Schuyler & Alberene, soapstone
Gen Mgr: Frank G Mothes

ALLIED CHEM CORP, GEN CHEM DIVISION
40 Rector St, New York 7, New York, or PO Box 70, Morristown, New Jersey (Mng Dept)
GOSSAN MINES, PO Box 819, Galax, 6 mi N of Galax, undergr, pyrrhotite concentrates
Gen Mgr: W J Trepp
Asst Gen Mgr: J R Pennington
Gen Supt: J O Nichols
Asst Mine Supt: W R Green
Geol: H E Puttuck
Mine Frm: J W Dillon
1,000-TON FLOT GRAV MILL
Mill Supt: J O Nichols
Asst Supt: W R Green
(See Colo NJ, NY)

AMERICAN CYANAMID CO, PIGMENTS DIV
Piney River
MINE, open pit, ilmenite & apatite
FLOT MILL, Piney River
Mine & Mill Supt: L L Campbell
PLANT
Pl Mgr: J F Hopkins
Asst Pl Mgr: L L Seivard
Mech Eng: J M McConaghy
Elec Eng: R W Leech
(See Ark, Fla Ga, NY)

AMERICAN PIGMENT CORP
Hiwassee
Exec VP: R G Fizer
iron oxide pigments

DOMINION MINERALS (DIV OF RIVERTON LIME & STONE CO)
Piney River
PINEY RIVER MINE, open pit
Gen Mgr: David S Croyder
Gen Supt: Thomas J Hynes
Mech Eng: Earnest P Wellford
Prod: 500 tons
500-TON GRAV MILL, Piney River, aplite
Mill Supt: Earnest P Wellford
(See Riverton Lime & Stone Co, Va)

FOOTE MINERAL CO
18 W Chelten Ave
Philadelphia 44, Pa
SUNBRIGHT DIVISION, Deffield, c/o W Edwin Dill, Jr
MINE, Sunbright, undergr limestone
Gen Mgr: A McDonell
Asst Gen Mgr: W Hudspeth
Mine Supt: T Evans
Mine Frm: J Hughes
MILL, at mine
CHEMICAL PLANT, at mine
(See NH, NC Pa, Tenn)

INTERNAT'L MINERALS & CHEMICAL CORP
Piney River
APLITE MINE
Supt: Claude Ellis
(See Ariz, Fla, Ill, Maine Miss, N Mex, NC, SD, Tenn, Wyo)

KYANITE MNG CORP
Dillwyn
Pres-Treas: Gene Dixon
VP: G A Dixon
Sec: Terrell Harvey
Purch Agt-Asst to Pres: Hugh B Andrews, Jr
BAKER MOUNTAIN MINE, Cullen, open pit, kyanite, mullite
WILLIS MOUNTAIN MINE, Dillwyn, open pit, kyanite
Gen Mgr: Gene Dixon
Asst Gen Mgr: Hugh B Andrews, Jr
FLOT MILL, at mine sites
PROCESSING & STORAGE PLANT, Pamphin
Sales Mgr: C B Kay

METAL & THERMIT CORP
HANOVER PLANT, Route 3 Beaverdam, open pit, rutile, ilmenite, aplite
Gen Mgr: K E Doud
Gen Supt: C M Goin
Prod: 800 tons

MINERALS & CHEMICALS PHILIPP CORP
Menlo Park, NJ
MINE, Strasburg, open pit, limestone
(See Fla, Ga, NJ)

NATIONAL GYPSUM CO
325 Delaware Ave
Buffalo 2, New York
MINE, Kimballton, undergr, limestone
Pl Mgr: Monroe Rule
Mine Supt: R G McDonald
Prod: 1,800 tons
1,500-TON MILL, at mine
(See Ariz, Ind, Iowa, Kans, Mich NY, Tex)

NEW JERSEY ZINC CO
Austinville
BERTHA MINERAL DIV
Zn, Pb
2,000 - TON FLOT MILL
Supt: C G Morgenstern
(See Colo, Ill, NJ N Mex, Pa, Tenn, Wisc)

REYNOLDS MINING CORP
Reynolds Metals Bldg, Richmond 18
Pres: Walter L Rice
VP: R H Zeglin
Purch Agt: J W Glover
Exec Asst to Pres: Sheldon P Wimpfen
(See Ark, Texas)

RIVERTON LIME & STONE CO (DIV OF CHADBOURN GOTHAM INC)
Riverton
RIVERTON MINE, open pit limestone, crushed rock
Gen Mgr: David S Croyder
Gen Supt: Thomas J Hynes
Mine Supt: James Thorpe
Mine Frm: Harry Esteppe
Prod: 1,200 tons
300-TON GRAV-HYDRATION MILL, Riverton
Mill Frm: C Weatherholt
(See Dominion Minerals, Va)

TRI-STATE ZINC, INC
123 William St
New York 38, New York
BOWERS-CAMPBELL MINE, Timberville, undergr Zn
Gen Mgr: V C Allen
Gen Supt: L G Hayes
Prod: 720 tons
720-TON FLOT MILL
Timberville
(See Ill, NY)

U S GYPSUM CO
300 W Adams St
Chicago 6, Ill
MINE, Plasterco, undergr, gypsum
Works Mgr: H D Decker
(See Calif, Colo, Conn, Ind, Ill, Iowa, Mass, Mich, Mont, N Mex, NY, Ohio, Okla, Tex, Utah)

VIRGINIA-CAROLINA CHEMICAL CO
401 E Main St
Richmond 8
Pres: Justin Potter
VP: C E Heinrichs
Sec: R C Long
Treas: A M Schuster
Purch Agt: Douglas W Laird
(See Fla, Tenn)

WASHINGTON

AMCO MNG CO
17401 10th NE, Seattle
Pres: Freeze
VP: G Barnes
Sec: Zula Oman
WAYSIDE MINE, Granite Falls area, Snohomish Co, undergr, Cu, Au, Ag
Gen Mgr: Fred A Lawless
Geol: Bill Ferran
Under devel & Producing
300-TON GRAV MILL, at mine, under construction
Mill Supt: Fred A Lawless

AMERICAN EAGLE MNG CO
9015 Empire, Millwood
Pres: Ronald E Madden
VP: Gilbert McGlocklin
Sec-Treas: Jerome Naylor
AGUILA MINE, Rice area, Stevens Co, Pb, Ag, Cu, Au
Under devel

AMERICAN SILVER MNG CO
123 W 4th Ave
Spokane
Pres & VP: J M Henneck
Sec & Treas: L B Conrad
(See Idaho)

AMERICAN SMELTING & REFINING CO
Box 69, Colville
NORTHPORT UNIT, surface, Zn, Pb
Mgr: J C Kieffer
Frm: Frank Paparich
Acct: Fred Harding
Prod: 1,000 tons
1,000-TON FLOT MILL
No Prod
TACOMA SMELTER, Box 1605 Tacoma, copper smelter, electrolytic refinery, arsenic refinery & acid plant
Mgr: R E Shinkoskey
Asst Mgr: M C Teats
Oper Supt: M L Plass
Purch Agt: H L Kindred
(See Ariz, Calif, Colo, Idaho, Ill, Md, Mont, Neb, NJ, N Mex, NY, Tex, Utah)

ACE OF DIAMONDS
Route 2, Cle Elum
Own. Clarence Jordin
MINE, Kittitas Co, Au, Ag
Under devel

AMERICAN ZINC, LEAD & SMELTING CO
927 Old Nat'l Bank Bldg
Spokane
Res Mgr: John W Currie
Purch Agt: R F Tharp
GRANDVIEW MINE, Metaline Falls, undergr, Zn, Pb
Asst Res Mgr: W M Calhoun
Mine Supt: Otis M Hagberg
Mine Eng: K A Tallmadge
Prod: 850 tons
800-TON FLOT MILL
Mill Supt: F H Shellenbarger
Assay: D J Burgett
(See Ariz, Ill, Mo N Mex, Ohio, Okla, Tenn, Tex Utah, Wisc)

BASIC MINERALS, LTD
Aladdin Rt, Colville
LAST CHANCE CONSOL MINE & GREAT WESTERN MINES, North Port, Stevens Co, undergr, Pb, Zn
Mgr: Irvin Bennett
No Prod
100-TON FLOT MILL, 6 mi from North Port
Mill Supt: Irvin Bennett
No Prod

BEAR CREEK MNG CO
W 917 Mallon Ave
Spokane
NW dist Geol: R D Hutchinson
MINE, Miner's Ridge area, Snohomish Co, Cu, Au, Mo, WO_3
(See Utah & Kennecott Copper Corp, NY)

BIG 5 METALS CO
Box 332, Cle Elum
SILVER TIP MINE, Kittitas Co, Au, Ag, Cu, Pb, Zn

BROCKWAY, JOHN & ELLIS, SID
2550 E St, Bellingham
(See Alaska)

BUNKER HILL CO, THE, PACIFIC DIV
2700-16th Ave SW
Seattle 4
LEAD FABRICATION PLANT & SECONDARY LEAD SMELTER
VP, Pac Div: Roger H Cutting
Prod Mgr: Alvin Kroll
BONANZA MINE, Colville, Pb, Ag
Under devel
(See Calif, Idaho)

CACHE CREEK MNG CO
2403 So Tacoma Way
Tacoma
Pres: H G Nickelsen
VP: C E Bonnell
Sec: C W Whitaker
(See Idaho)

CHIEF JO TUNGSTEN INC
Box 689, Okanogan
Mgr: Fred Timm
CHIEF JO MINE, Goose Lake area, Okanogan Co, WO_3
Under devel
50-TON GRAV MILL
Under constr

CLAYLOON URAN CO, INC
319 Peyton Bldg, Spokane 1
Pres. Byrl T Goodwin, Jr
LEAD TRUST & LEAD KING MINES, Gladstone Mtn, Stevens Co, Pb
Limited Prod

CLE ELUM RIVER MINING CO, INC
310 Blaine St
Seattle 9
Pres: Phil Denney
VP: Don William Denney
Sec-Treas: F B Denney
CAMP CREEK SILVER, SILVER CREEK GOLD & MT HAWKINS COPPER PROPERTIES, Camp Cr area, Kittitas Co, Ag, Au, Pb, Zn, Cu
Under devel
50-TON GRAV MILL, Camp Cr

CLEAR WATER MINES, INC
401 Empire State Bldg
Spokane 1
Pres: H G Loop
VP: John Healy
Sec-Treas: E I Fisher
Purch Agt: John Healy
(See Idaho)

CONJECTURE MINES, INC
421-427 W 3rd Ave
Spokane
Pres & Purch Agt: Donald E Major
VP: Herbert L Sanderson
Sec-Treas: Lyle H Funnell
(See Idaho)

CONSOL MINES & SMELTING CO, LTD
Star Rt, Wilbur
Pres: Hugh Brown
VP: Jack Blaine
Purch Agt: Douglas Brown
Sec: E H Edgar
Treas: D N Gellatly
THREE PROPERTIES at Keller, Ferry Co, undergr. & open pit, Cu, Mo, Pb, Zn, Mn, U_3O_8
Under devel

DAWN MNG CO
Ford
Pres. G S Hinsdale
VP: M D Banghart
Sec: J E D Grunrow
Purch Agt: Harold Davidson
MIDNITE MINE, Stevens Co, open pit, U_3O_8
Gen Mgr: J A Pike
Asst Gen Mgr: P E Stucker
Mine Supt: Keith Payne
Prod: 1,000 tons
500-TON MILL, Ford
Mill Supt: W Darlington
Assayer: Lloyd Workman
(See NY)

DAYBREAK URANIUM, INC
12707 E Valleyway, Opportunity 67
Pres: James W Fox
VP: A Alvensleben
Sec-Treas: Kae H Sowers
DAYBREAK MINE, Spokane Co, open pit, autunite, uraninite, coffinite
Mine Supt: E A Collins

DELMAR MNG & MLG CO
N 5018 Lincoln
Spokane 19

Pres: Norman E Mills
VP: Adolph Okert
Sec: Harry O Klaus
(See Idaho)

DEVIL'S CANYON MNG CO, INC
801 Central Bldg, Seattle 4
Pres & Gen Mgr: Vernon M Osterberg
VP: W D Gotham
Sec: Ragni B Osterberg
Treas: Dr G M Osterberg
DEVIL'S CANYON MINE, Buena Vista Mng dist, King Co, undergr & open pit, MoS_2, Au, Ag, Cu
Under devel

DOW MINERALS, INC
1008 21st St, NW
Puyallup
Pres: James Dow
BROWN BEAR MINE, Harts Pass area, Okanogan Co, Au
Under devel

EVERGREEN URANIUM EXPLORATION CO
Route 1, Box 69, Rockford
Pres: J V Dimitroff
VP: M C Bennett
Sec & Treas:
Norman L Mikalson
MOURNING LEASE MINE, Mt Spokane dist undergr & open pit U_3O_8
Gen Mgr J V Dimitroff
Under devel & producing

FERN GOLD MINING CO
705 Peyton Bldg, Spokane 1
Pres: Joseph Drumheller
VP: Myrtle Woldson
Sec-Treas: L R Gordon
(See Alaska)

FLAG HILL MINES CORP
412 S Washington St
Olympia
Pres & Purch Agt: Percy L Berg
VP: I J Olson
Sec-Treas: Mrs Enid K Neilan
OROVILLE PROPERTY, on Wannacut Lake, 8 mi SW of Oroville, undergr, Au, Ag, Pb, Cu, Zn, Mo
REPUBLIC PROPERTY, 1 mi W of Republic, undergr, Au, Ag
Gen Mgr: Percy L Berg
Under devel

FORD ROCK MINE, INC
Box 382, Post Falls, Idaho
Pres: W E Neff
VP Jack Purdy
Sec-Treas Simmie De Marre
FORD ROCK MINE Ferry Co, open pit, U_3O_8
Under devel

FOURTH OF JULY MINE
9 Pogue Rd, Omak
Mgr Cecil B Murray
MINE, Conconully area, Okanogan Co, Ag

GERMANIA CONSOL MINES, INC
401 Empire State Bldg
Spokane 1
Pres & Gen Mgr: Henry J Franz
VP: H G Loop
Sec-Treas E I Fisher
GERMANIA CONSOL MINE, Hunters, undergr, WO_3, U_3O_8
40-TON GRAV FLOT MILL
Hunters
No Prod

GOLD EAGLE MINES, INC
1469 4th St, Chehalis
Pres Orville W Roundtree
VP: Stanley Reszkowsky
Sec: Berneice Duchscher
(See Nev)

GOLD FLOTATION DEVELOPMENT CO
401 Empire State Bldg, Spokane
Pres & Mgr H G Loop
Sec-Treas: E I Fisher
SINGISER GROUP, Gravel Range dist, Forney-Cobalt
No Prod

GOLDFIELD CONSOL MINES CO
#1 Montgomery St
San Francisco, Calif, or Alladin Rte, Colville
ANDERSON MINE, Leadpoint dist, Zn, Pb
Gen Supt: Cline E Tedrow
Under devel

GRANDVIEW MINES
310-311 Radio Central Bldg, Spokane 4
Pres: Karl W Jasper
VP: Paul Hoetzel
Sec: E K Barnes
GRANDVIEW MINE, Metaline Zn, Pb (Operated by American Zinc, Lead & Smelting Co)
Prod: 800 tons
JUST TIME CLAIMS, Lead-point area Stevens Co, Pb, Zn
Under devel

GREEN NUGGET MNG CO
Ione
Mgr: E Sheffler
WAHOO & GREEN NUGGET MINES, Lamb Cr area, Pend Oreille Co, U_3O_8
Under devel

H HALVORSON, INC
PO Box 6, Yardley
Pres: H Halvorson
SILVER HILL MINE, Sec 23 T24N R43E, WM, open pit, WO_3
Gen Mgr: Robert N Roby
Met: J Fred Williams
Mine Supt: Frank Coon
Prod: 50-150 tons
150-TON GRAV MILL, at mine

HAMMOND & JOHNSON
PO Box 112, South Bend
Part: A W Hammond South Bend
L C Johnson Box 147 Oroville
MINE, Shankers Bend area, Okanogan Co, Fe
Under devel
KRUGER MT MINE Oroville, open pit, magnetite, Ag, Au
Mine Frm: A A Johnson
Prod: 10 tons
Under devel
MILL, under const

HERA EXPLOR CO
Box 8, Renton
Pres & Gen Mgr
W H Pillatoe
VP: Dr W J Collins
Sec: George Ames
Met-Geol: J J Sherwood
(See Mont)

HILL, C C
W 815 Mt View Ave
Spokane 53
KULZER MINE, Valley area, Stevens Co, Fe
No Prod
(See Idaho)

INDUSTRIAL MNG INC
Route 3, Box 260,
Sedro Wooley
Pres Fred P Nielson
VP: M F Nielson
Sec-Treas: Nellie Nielson
MINE, Twin Sisters area Skagit Co, open pit, Cr_2O_3
Under devel & producing

IOWA MINE
Lessee: Robert T Curtiss
Route 1, Box 156, Monroe
MINT CLAIM, Sultan Basin dist, Snohomish Co, undergr, Cu, Ag, Au, Mo
Under devel
(Leased from Sultan Basin Mng co)

ISBELL CONSTRUCTION COMPANY
PO Box 2351 (3113 S Virginia St) Reno, Nev
MIDNITE MINE (leased from Dawn Mining Co)
Supt: John Amberson
Asst Supt: Luther Krupp
Mech Frm: Howard Bailey
(See Dawn Mining Co, Wash, and Isbell Const Co, Nev)

JEZEBEL MINE
PO Box 51, Connell
Pres: J E Thornton
(See Arizona)

KASLO MINES CORP
401 Empire State Bldg
Spokane 1
Pres & Mgr: H G Loop
VP: E D Thompson
Sec-Treas: E I Fisher
Res Agt: Wm Clark
KASLO MINE, Rocky Bar dist, Au, Ag, Pb, Cu
No Prod

KNOB HILL MINES, INC
206 Sansome St
San Francisco, Calif
Pres: H N Kuechler, Jr
VP & Gen Supt: A R Patterson
Sec: D D Farley
Treas: L E Hellar
KNOB HILL MINE, Republic dist, undergr
Gen Mgr: A R Patterson
Mine Supt: J E Davis
Mine Frm: F E Jordan
Mine Eng: L R B Atwater, Jr
400-TON FLOT MILL, cyanidation of tailings
Mill Supt: Louis Lembeck
Mill Frm R A Kells
Mill Assay A D Brenner

KROMONA CONSOL MINES, INC
721 Lloyd Bldg
6th & Stewart, Seattle 1
Pres Joe F Krom
VP H P Nielson
John F Meduna
Sec-Treas Louie Williams
KORMONA MINE, Sultan dist Cu, Mo, WO_3, Ag, Au
Gen Mgr Joe F Krom
Cons Eng: W A Richelson
Mine Frm: Earl Bellamy
120-TON FLOT MILL, at mine
Mill Supt: W H Marquette

LA SOTA-JONES LEAD & ZINC CO
Metaline Falls
Pres F P LaSota
VP: E P Jones
Sec-Treas: Dolly Ricker
LA SOTA JONES MINES, Slate Ck dist, surface, Zn, Pb
Under devel

LEE MINES, INC
123 N Foote, Olympia
Pres & Purch Agt:
Mordello L Lee
VP Paul V Smith
Sec-Treas: Margaret Ojeda
(See Idaho)

D & B LEWIS MINING CO
Box 487, Chewelah
Sec-Treas & Purch Agt
Mrs Patricia A Lewis
Agt: Everett W Stark, 519 California St, San Francisco 4, California
EAGLE MOUNTAIN MINE, on Eagle Mt 6 mi E of Chewelah, undergr and open pit, Ba
Gen Mgr: A F Bradeen
Gen Supt: Donald E Lewis
Prod: 25 - 50 tons
GRAVITY MILL, planned

LITTLE KING TUNGSTEN MINE
Box 384, Deer Park
LITTLE KING TUNGSTEN MINE, Blue Grouse Mt, WO_3
Mgr W H West
Prod: 12-15 tons
25-TON GRAV MILL at mine

LOVITT MNG CO, INC
Box 1668, Wenatchee
Pres: E H Lovitt
VP: Vere McDowall
Purch Agt: Leo McRae
GOLD KING MINE, 3 mi S of Wenatchee, undergr & surface, Au, Ag, silica
Mine Supt: Oscar Thompson
Prod: 250 tons

MAGNESIUM MINES, INC
c/o George Siegel,
W 1818 Mission, Spokane
MAGNESIUM MINES, INC (FORMERLY QUEEN SEAL GROUP), Au, Ag, Cu, Pb, Zn

MAGNETIC MINES, INC
Route 3, Box 3187
Wenatchee
Pres: Marion Bumgarner
VP: O Gensinger
Sec-Treas. Fern Van Horne
MAGNETIC MINE, northern Okanogan Co, open pit, Fe
Gen Mgr: Howard Harris
Under devel

MILLER & DAVIS (MNG PARTNERSHIP)
19450-208th Ave SE
Renton
KOSCHUTZKE MINE, Rt 2, Kettle Falls, undergr, Ag, Pb, Zn
Geol: Jack Miller, Thomas Davis
Under devel

MONTANA IRON MNG CO
5716 Orcas St, Seattle 18
Pres & Purch Agt:
Dewey F Whittaker
VP: W E Hall
Sec: Gail H Whittaker
Treas: M K Whittaker
VOGO MINE, open pit, Fe
Gen Mgr: D F Whittaker
Asst Gen Mgr & Eng:
W E Hall
Under devel
(See Mont)

NELSON HILL MINE
Route 2, Cle Elum
Own: Ollie Jordin,
Clair Wynecoop
MINE, Liberty area, Kittitas Co, Au
Under devel

NEVADA RAWHIDE MNG CO
114 College Ave, Cheney
Pres: Clarence Davis
VP Cline E Tedrow
Sec Arthur Colyar
Treas: Arthur Colyar
PYRAMID MINE, Pb, Ag, Au
Gen Mgr H M Erb
Geol Cline E Tedrow
Elec Eng Lyman Johnson
Under devel
TENDERFOOT GRP, Stevens Co, Gillette Min Area Pb, Ag
Under devel
25-TON FLOT MILL, Holy Cross mng dist, Nev
Mill Supt-Mill Frm:
H M Erb
Assayer H M Stowel Co
COEUR d'ALENE STAR GROUP, SILVER BELL MINE, Eddy Creek Mng dist, Sanders County, Mont, Pb, Ag, Cu

NEW YORK-ALASKA GOLD DREDGING CORP
2503 Smith Tower
Seattle
Pres & Man Dir: J K Crowdy
VP: G G C King
Purch Agt L E Robbins
(See Alaska)

NORTH WESTERN MNG & EXPL CORP
12822-3rd S, Seattle
Pres Albert L Workman
VP: Lyman Battey
Sec-Treas James E Williams
(See Utah, Mont)

NORTHWEST MAGNESITE CO
Chewelah
Pres: E A Garber
VP: C A Sargent
Sec: E R Wilker
Treas. R B Stroenider
Gen Mgr: H A Ziebell
Pl Supt: Barney Endrice
Pl Eng: Clyde Holen
Purch Agt: L A Knight
RED MARBLE MINE, 20 mi SE of Chewelah, surface, magnesite
Mine Supt: Roger L Fisk
Mine Frm: Lloyd King, John Estes
Mine Eng: J Brammer
Prod: 2, 000 tons
3, 000-TON FLOT MILL & HEAVY MEDIA
Mill Frm: G M Kerns

NORTHWEST MINERALS, INC
PO Box 1344, Spokane 1
Pres: Forrest M Garrett
VP: H E Besly
Sec-Treas & Purch Agt:
Don A Gillis
WYNCOOP LEASE, Willpinit, undergr, U_3O_8
Cons Eng: Sam Richardson
Fld Geol: David M Berry
Explor
(See Idaho)

NORTHWESTERN MNG CO
PO Box 826, Des Moines
(See California)

OLYMPIC MANGANESE MNG CO
1129 10th Ave North
Seattle
Pres & Gen Mgr W J Logus
Sec-Treas: M A Logus
TUBAL-CAIN MINE, 15 mi W of Quilcene, undergr, Mn
No Prod

P & H EXPLOR & MNG CORP
Box 133, Wenatchee
Pres George W Heller
FAIRVIEW CLAIMS, Dry Canyon, Pend Oreille Co, Ag, Pb, Zn
Under devel

PACIFIC OIL & MINES EXPLORATION CO
Box 1257, Chelan
Mgr R G Stewart
Geol: Walter D Paterson
45 & MONTANA MINES, undergr Ag, Pb, Zn, Cu, Au
Under devel

PAYMASTER MINES, INC
Box 44, Pateros
Pres & Mgr Paul Rogstad
VP H Rolen
Sec-Treas H Pickering
HOLDEN-CAMPBELL GRP, Squaw Dr dist, near Pateros Cu, WO_3, Au, Ag
Under devel
50-TON GRAV MILL
Under constr

PEND OREILLE MINES & METALS CO
923 Old Nat'l Bank Bldg
Spokane 1
Pres: Jens Jensen
VP W W Witherspoon & C E Schwab
Sec & Treas: A C Wimberly
Cons W L Zeigler
PEND OREILLE MINES, 3 mi N of Metaline Falls, undergr, Zn, Pb, Ag
Purch Agt: R G Walker
Res Mgr L M Kinney
Supt L G Billings
Frm: Craig Cody
Mine Eng Paul McIlroy
Ch Eng & Geol:
Roy A Anderson
Prod 2, 000 tons
2, 400-TON FLOT MILL, Metaline Falls
Mill Supt J C Crampton
Assayer R W Townsend
Ch Elec R A Skeman

PUEBLO MINING CO
1821 S 1st St, Yakima
Pres: E Griesinger
(See Ore)

RENSLOW, FORREST
E 1222 Crown, Spokane
LUCKY STRIKE MINE, Pend Oreille County, Au, Ag, Cu, Pb, Zn

ROCKCREEK SILVER LEAD CO
2008 W Riverside Ave, Spokane
Pres: F Messer
Sec & Mgr: J H Christman
(See Idaho)

RUBY VALLEY DEVEL CO, INC
6216 S Montgomery St, Tacoma 9

Pres: H K Albrecht
VP: Raymond Bauman
Sec: Fred E De Puy, 5413 112th St SW, Tacoma
Treas: H B Gibbs
(See Mont)

SADDLEROCK PROSPECT
826 Red Apple Rd, Wenatchee
Own: Joseph A Janni
MINE, Wenatchee area, Chelan County, Au, Ag
Under devel

SHERMAN MNG CO
PO Box 113, Omak
Pres-Purch Agt: C C Sherman
VP: W E Sherman
Sec-Treas: Theo H Hohn
SHERMAN MINE, 3 mi W of Omak, on Epley Rd, Ag, Pb, Zn, Au, undergr
Gen Mgr: C C Sherman
W E Sherman, Theo H Hohn
Geol: W E Sherman
Under devel
50-TON FLOT GRAV MILL, at mine
Under devel

SILVER CHIEFTAIN CO
PO Box 158, Spokane
Pres: E E Johnston
Sec-Treas: J B Phillips
SILVER CHIEFTAIN MINE
No Prod

SILVER MTN MNG CO
2403 S Tacoma Way, Tacoma
Pres: Arthur G Nickelsen
SILVER STAR MINE, Tonasket area, Okanogan Co, Ag, Au, Pb, Zn
Under devel
200-TON MILL, Tonasket
No Prod

SOREN MNG & MLG CORP
Route 1, Sedro Woolley
Pres: Wm R Soren
VP: Kenneth Hardy
Sec-Treas: W Z Soren
DIAMOND MINE, Cascade Pass area, Skagit Co, undergr, Ag, Pb, Zn
Under devel

SPOKANE-IDAHO MNG CO
611 Peyton Bldg, Spokane 1
Pres: Frank N Marr
Sec: C D Randall
Treas: Charles E Marr, Jr
(See Idaho)

SPOKANE NATIONAL MINES, INC
414 Fernwell Bldg, Spokane
Pres & Gen Mgr: G H Allison
Exec VP: H J Tibbits
DAHL MINE, HUFFMAN, TWILITE AND BLUE MT MINES, Mt Spokane area, Spokane Co, U_3O_8
Under devel
BIG SMOKE PROP, Stevens Co, Turtle Lake area, U_3O_8
Under devel
(See Idaho & Mont; Sunset Mines, Inc, Wash & Mont)

SUNNY PEAK MNG CO
401 Empire State Bldg
Spokane 1
Pres: C J Weller
VP: Albert T Fleming
Sec-Treas: E I Fisher
Purch Agt: C J Weller
MINERAL HILL MINES, GUBSER GRP, MOHAWK MINE, Conconully, Okanogan County, undergr, Ag, Cu, Pb
No Prod
Gen Mgr: C J Weller

SUNSET MINES, INC
(Wholly owned subsid of Spokane National Mines, Inc)
414 Fernwell Bldg, Spokane
Pres: G H Allison
Sec-Treas & Purch Agt: H J Tibbits
(See Mont; also see Spokane National Mines Inc, Idaho, Wash & Mont)

SUNSHINE MNG CO
W 300 Mission Ave, Spokane 1
Pres: Robert M Hardy, Jr
VP: C M Hull
Sec: Stanton B Bennett
Treas: Vincent P Whelan
Gen Mgr, Mng Div: John Edgar
Gen Mgr, Petroleum Div: A F Wynn
(See Idaho, N Mex)

THOMAS CONSOL MINES, INC
640 Peyton Bldg, Spokane
Pres: David E Watson
MINE, Republic area, Ferry Co, Au
Under devel

TREASUREMONT MNG CO
1129 10th Avenue N
Seattle
Pres & Gen Mgr: W J Logus
Sec & Treas: M A Logus
(See Idaho)

TRITON MNG CO
422 Paulsen Bldg, Spokane
Pres: Darrell Newland
VP: Cline E Tedrow
KELLY CAMP MINE, Bodie Mtn area, Ferry Co, WO_3 Cu, Mo
Under devel
PIONEER MINE, Colville area, Stevens Co, Zn, Pb, Ag
SHUMAKER MINE, Colville area, Stevens County, Zn

TUNGSTEN MT MNG CO
511 Securities Bldg
Seattle 1
(See Nev)

UNITED IDAHO MNG CO
c/o Roger Pierce
Salt Lake City, Utah
MAJOR BUDD MINE, Rampart Mt dist, near Butte, Mont, Au, Ag, Pb, Cu
No Prod

WAR EAGLE MNG CO INC
PO Box 1043, Yakima
(See Idaho)

WESTERN EXPLORATION AND DEVEL CO
9008 E Taylor, Tacoma
Pres: John Skusek
VP: John B Drake
SALMON CREEK #1 through 20 MINES, Index mining dist, Salmon Cr area, open pit, Cu, Au, Ag
Geol: John Skusek
Under devel

WESTERN GOLD MNG INC
712 Vance Bldg, Seattle 1
Pres-Purch Agt: Harry P Kramer
VP: M S Alexander
Sec-Treas: George D Bender
NEW LIGHT MINE, Slate Cr dist, Whatcom Co, undergr, Au, Ag
Under devel
100-TON FLOT MILL

WESTERN URANIUM MINES, INC
Box 1344, Spokane 1
VP: Abner M Ingebretson
Sec & Gen Mgr: Don A Gillis
Cons Eng: Sam H Richardson
SHERWOOD LEASES, Wellpinit, Spokane Indian Reservation, open pit, U_3O_8
SNEVA LEASE, Milan (Mt Spokane)
WILLMORTH LEASE, Wellpinit, U_3O_8
Explor

WHITEDELF MNG & DEVEL CO
401 Empire State Bldg
Spokane 1
WHITEDELF MINE & MILL
Clark Fork, Idaho
(See Idaho)

WINDRIVER MNG CO
1936 N Lombard St, Portland, Ore
Pres: Everett N Philpott
VP-Purch Agt: George E Philpott
Sec-Treas: Kent M Nielson
WINDRIVER MINE, near Paradise Cr Camp, Skamania County, undergr, Au, Ag
Gen Mgr: Everett N Philpott
Geol: David E Laughran
Met: Mel Playfair
Under devel
50-TON FLOT MILL, at mine
BALL PILOT MILL running separation tests

WRIGHTSMAN, HENRY J
PO Box 3, Clinton
GREEN MT MINE, Clinton, King Co, Snoqualmie dist, 6 patented claims, undergr, & open pit, Fe, magnetite, hematite
Under devel

ZALLA M MINE
Republic
Own: A E Reid
MINE, E Fork Toroda Cr, Ferry Co, Ag, Cu
Limited Prod

WISCONSIN

AMERICAN ZINC, LEAD & SMELTING, CO
1515 Paul Brown Bldg
St Louis 1, Mo
VINEGAR HILL DIVISION MINE, Shullsburg, undergr, Zn, Pb
Gen Mgr: C A Dobbel
Res Mgr: J P Lacke
Mine Supt: P J Mills
Mine Frm: E M Kreul
1,000-TLOT MILL
Mill Frm: M Hendricks
(See Ariz, Ill, Mo, N Mex, Ohio, Okla, Tenn, Tex, Utah, Wash)

BAY CITY SILICA CO
Bay City
MINE, undergr, silica, sand

CUBA MNG CO
118 S Court St, Platteville
Mgr: J P Lacke
Sec: H M Hoffman
Treas & Purch Agt: A W Heins
PIERSON MINE, Mineral Point, undergr, Zn, Pb, (subleased to Ivey Const Co)
Mgr: Roger Ivey
TEASDALE MINE, Benton undergr, Zn, Pb (subleased to New Teasdale Mng Co)
Mgr: John Cherry
No Prod

THE EAGLE-PICHER CO, CHEMICALS & METALS DIVISION
PO Box 1040, Galena, Ill
Mgr of Op: Robert L Haffner
Gen Supt: Harold H Haman
Asst Gen Supt: Henry B Farrey
Geol: William E Arndt
Maint Supt: Clarence P Lyden
Mine Supt: Edmund L Hovy, Harold A Wisco
Mill Supt: Cecil C Crow
Mill Frm: Billy Crow, Glenn Brotzman
Mine Supt: Victor E Van Matre
SHULLSBURG MINE & MILL, Shullsburg, Zn, Pb
Prod: 1,200 tons
BIRKETT MINE, Hazel Green, Zn
No Prod
LINDEN MINE & MILL, Linden, Zn
No Prod
(See Ill, Kans, Nev, Ohio, Okla)

GRIMES MNG CO
Platteville
Mgr: Joe Grimes
MINE, Zn, Pb
Under devel

MAIDEN ROCK SILICA CO
Maiden Rock
Own: Delbert Gore
MINE, undergr, silica sand

MIFFLIN MNG CO
Rewey
Pres: Walter Hennes
Gen Mgr: John Howland
MINE, Pb, Zn
130-TON MILL

NEW JERSEY ZINC CO
Box 252, Platteville
ELMO MINE
Supt: J M Hague
Frm: B E Daugherty
Under devel
EXPLORATION STAFF
Res Geol: Wayne Zwickey
(See Colo, NJ, N Mex, NY Pa, Tenn, Va)

OGLEBAY NORTON CO
1200 Hanna Bldg, Box 6508
Cleveland 1, Ohio
MONTREAL MINE, 4 mi W of Hurley, undergr, Fe
Prod: 3,950 tons
(See Minn, Ohio)

PICKANDS MATHER & CO, ODANAH IRON CO
Duluth, Minn
CARY MINE, Hurley, undergr
Supt: Russel L Jose
(See Mich, Minn, Ohio)

PIQUETTE MNG & MLG CO
1515 Paul Brown Bldg, St Louis 1, Mo; or Box 4, Platteville
PIQUETTE #2 MINE, undergr, Zn, Pb
Gen Mgr: F B Piquette
Supt: Bernard Murray
Under devel
300-TON FLOT-GRAV MILL, Potosi Supt: John Knebel, Jr
MINE, Tennyson, undergr, Zn, Pb
Gen Mgr: F B Piquette
Prod: 300 tons
FLOT MILL, Tennyson
Prod: 450 tons
(Joint Venture with American Zinc, Lead & Smelting Co)

WYOMING

AMERICAN COLLOID CO
5100 Suffield Court
Skokie, Ill
Pres: Paul Bechtner
VP: William D Weaver
Asst Sec-Treas: Jeanette Dixon
Purch Agt: Roy H Harris
UPTON MINE, Upton, open pit, bentonite clay
Gen Mgr: Orville Horn
Asst Gen Mgr: Donald Horn
Prod: 250 tons
350-TON MILL, Upton, drying and grinding
(See Ill, Miss, SD)

ANSCHUTZ DRILLING CO, INC
1411 Mile High Center Bldg, Denver, Colo
FLY GROUP, Converse Co, undergr, open pit, U_3O_8
(Leased to B-Mines, Inc)
(See Colo, Utah)

ARCHER-DANIELS-MIDLAND CO
700 Investors Bldg
Minneapolis, Minn
COLONY MINE, Crook Co, bentonite
UPTON MINE, Weston Co, bentonite
(See Minn)

BALBOA MNG & DEVEL CO
Box 861, Grand Junction, Colorado
LUCKY MICK MINE, Moorcroft, undergr, U_3O_8, V_2O_5
Gen Mgr & Supt: A F Stoick
Frm: Dell White

BASIN ENGR CO
Bagge
Pres: R K Lisco
VP: D L Hankins
Sec: W M Addison
TETON MINE, undergr, U_3O_8
Mine Supt: W M Addison
Prod: 20 tons
LUCKY STRIKE MINE, Carbon County, U_3O_8

BENTON CLAY CO
PO Box 432, Casper
Pres: Fred Carr
VP & Gen Mgr: I Kreiner
Sec-Treas: Henry Burgess
BENTONITE MINE, Natrona County, placer
Gen Supt: R E Goering
Geol: Fred Carr
Mech Eng: R E Goering
MILL, Casper

BIG BEND MINING CO
PO Box 174
Loveland, Colorado
Pres: E L Pennington
VP: Arthur J Moskal
Sec-Treas: B R Winkley
MINE, 22 mi S of Jackson, address Box P P, Jackson, placer, Au, Ag, Pt, Fe
Gen Mgr: B R Winkley
Gen Supt: E L Pennington
Mech Eng: J O'Malley
Prod: 3,000 tons
3,000-TON GRAV-HEAVY-MED MILL, at mine

BLACK HILLS BENTONITE CO
Moorcroft
Pres: H T Thorson
Gen Mgr: A C Harding
Asst Gen Mgr: T A Thorson
MINE, Moorcroft & Upton, surface, bentonite
Prod: 200 tons
150-TON MILL, drying & grinding

BOWEN, HERLDON H
135 S La Salle
Chicago, Ill
B L NO 1 & HOMESTAKE LODE NO 1 MINES, Crook Co, U_3O_8
JEANETTE #1, MARY #1, OSAGE #1, BLACK STAR #1 & SCOTT #1 MINES, Campbell Co, U_3O_8

CHAPMAN & MOREHOUSE MNG CO
616 Rood Ave, Grand Junction, Colorado
Parts: J L Chapman
G E Morehouse
Explor and devel

COLORADO FUEL & IRON CORP
Sunrise
SUNRISE MINE, undergr, Fe (hematite)
Supt: M L Sisson
Asst Supt: R L Wahl, Jr
Eng: H B Lynch
Ch Elec: R E Davis
Ch Chem: H A Robb
Mine Frm: A E Testolin
Prod: 2,500 tons
(See Colo, Utah)

CONTINENTAL MATERIALS CORP
820 South 9th
Grand Junction, Colo
MINES, Crooks Gap, open pit & undergr, U_3O_8
Gen Supt: Herbert Reynolds
(See Colo, Utah & Continental Uranium Co of Wyo)

CONTINENTAL URANIUM CO OF WYO
Box 1550, Grand Junction, Colorado
Pres: Willard Gidwitz
VP: Joseph B Cleary
Sec-Treas: Max Braun
Chr of Bd: G S Gidwitz
SIESMIC MINE, Jeffrey City, undergr, U_3O_8
Gen Supt: C H Reynolds
Mine Supt: R K Dondero
Prod: 200 tons
(Co a subsidiary of Continental Materials Corp, Colo & Utah)

COPPER BUTTON MNG CO
c/o Stanley Sims
Jeffrey City, Wyo
MINE

CRYSTAL CREEK GYPSUM CO
243 W Main St, Lovell
Pres: Alfred Deschenes
VP: Henrietta M Deschenes
Sec: Thomas Wilder
Treas: Joseph Black
CRYSTAL CREEK GYPSUM MINE, Crystal Creek & Himes, open pit, gypsum
Under devel

FEDERAL-GAS HILLS PARTNERS
520 E Main St, Riverton
Pres: R W Neyman
BUSS, CLYDE, SAGEBRUSH & OTHER MINES, Gas Hills dist, undergr & open pit, U_3O_8
Prof Mgr: R G Lindlof
Ch Eng: H Norman
Mech Eng: W Hall
Met: H Franco
Maint Supt: J V McGuffie
Mine Supt: E Buoy
Mine Frm: J Compton
Prod: 800 tons
520-TON MILL, Gas Hills dist
Mill Supt: R Shimmin
Asst Mill Frm: J D Taylor
(See Federal Resources Corp, Idaho, N Mex, Utah)

GLOBE MNG CO
(Unit of Union Carbide Corp)
Box 1049, Grand Junction, Colorado
GLOBE MINES, Riverton, Fremont Co, Gas Hills area, open pit, U_3O_8
Gen Mgr: J L Lake
Mgr, Mines: J F Emerson
Mgr, Plants: A C Sada
Pl Supt: K W Lents
Mine Supt: Robert Taylor
492-TON MILL, at mine
Mill Supt: P W Wyatt

GOLDEN CLOVER CORP
Box 115, Encampment
Pres: H V Norris
VP: Geo R Edwards
Sec: Jack H Parkhurst
MINE, undergr & open pit vermiculite
PORTLAND & GOLDEN COIN MINES, Battle Lake mng dist, undergr, Cu, Au, Ag
Under devel

GREAT WESTERN OIL CO
Box 2286, Huntridge Sta, Las Vegas, Nev
Pres: Geo H Wheeler
VP: Edward H Taketaya
Sec-Treas & Purch Agt: Charles von Goerken
PHOENIX 1ST MINE (HIGH-NOON, MIDNIGHT, HORSESHOE, STAR, SNOW, GAMMA QUEEN, JOKER & ACE CLAIMS)
Lovell, on Big Horn Riv at Kane, undergr, U_3O_8, VO_5
Gen Mgr: Charles von Goerken
Geol: Geo H Wheeler
Elec Eng: W E Hines
Asst Mine Supt: W A Kent
Under devel

GREEN MT URANIUM CORP
Lander
Mgr: Elton Clark
MINE, Crooks Gap, U_3O_8

GREEN RIVER OIL & URANIUM CO
26 W Broadway
Salt Lake City, Utah
HAL, BART, EAGLE, SKOAL GROUP, Gas Hills Area, Fremont Co, open pit, U_3O_8
(Mined by Utah Const & mng Co, Riverton)
(See Colo, Utah)

HAMLIN EXPLORATION & MINING CO
Gillette Route, Midwest
Wyo Mines Supt: Wm C Hamlin

CARIBOU MINE, 6 mi SE Ross, Converse Co
CHRYSOPS MINE, 5 mi S of Turnercrest, Campbell Co
GREENLEE MINE, 8 mi SE of Lynch, Johnson Co
NORTH CENTRAL MINE, 8 mi NW of Pine Tree Jct, Campbell Co,
TURNERCREST C760 MINE, 5 mi S of Turnercrest, Campbell & Converse Cos
All Mines: open pit, U_3O_8
Total prod: 4,800 tons yrly
(See Calif)

HERRSTROM, H O
2305 12th St, Rock Island, Ill
GEM H Q BIG HORN MINE, Fremont Co, open pit, U_3O_8
(See Ill)

HIDDEN SPLENDOR MNG CO, THE
PO Box 2306, Salt Lake City 10, Utah
SUNSET OPEN PIT, Gas Hills area, U_3O_8
Geol: Robert L Akright
(See N Mex, Utah)

HILMER-CUMMINGS MINING CO
Box 206, Riverton
Part: Martin C Hilmer & John D Cummings
QUESTION MARK MINE, Copper Mtn, 25 mi N of Shoshone, undergr, U_3O_8
Gen Mgr: John D Cummings
Gen Supt & Mine Supt: Raymond C Hall
Mech Eng: Carl F Cummin
Asst Mine Supt: James A Lawrence
Mine Frm: George W Longworth
Prod: 100 tons

HOMESTAKE MINING CO
Lead, So Dak
HAUBER MINE, Hulett, undergr, U_3O_8
Mine Supt: C N Kravig
NEW HAVEN CLAIMS MINE, Crook Co, U_3O_8
Asst Mine Supt: W C Campbell
Mine Frm: Tom Connolly
Prod: 320 tons
(See Calif, N Mex, SD, Utah)

INTERMOUNTAIN CHEMICAL CO
Box 872, Green River
Div Mgr: R A Bondurant, Jr
Purch Agt: R T Guest
WESTVACO MINE, undergr, trona
Gen Mgr: E L Stout
Asst to Gen Mgr: W C Bauer
Gen Supt: R Kvidahl
Geol: L K Norseth
Mech Eng: H F Young
Elec Eng: L Ruffini
Gen Maint Supt: H C Hartmann
Mine Supt: T S Bernatis
Asst Mine Supt: J W Coulon
Mine Frm: W F Peters
Mine Eng: W Z Wenneborg
Prod: 3,000 tons
2,500-TON MILL, at mine, solution & recrystallization
Mill Supt: W D Smith
Mill Frm: R Bruce
(See Food Machinery & Chem Corp, Calif, & Nev)

INTERNAT'L MINERALS & CHEMICAL CORP
5401 Old Orchard Rd
Skokie, Ill
MINE, Crook Co, surface, bentonite
Mgr & Purch Agt: K L Arthur
MILL, Belle Fourche, S Dak
(See Ariz, Fla, Ill, Maine, Miss, N Mex, NC, S D, Tenn, Va)

KERR McGEE OIL INDUSTRIES
Kerr McGee Bldg
Oklahoma City, Okla
Casper Office, Midwest Bldg, PO Box 219

URANIUM prod
Dist Geol: F A Groth
Landman: Dale Trubey
(See Ariz, Colo, N Mex, Okla & Kermac Nuclear Fuels, N Mex)

LEVI, DALE B
1450 York St
Denver 6, Colorado
SECTION 16 MINE, Gas Hills, open pit, U_3O_8
Gen Mgr: D B Levi
Asst Gen Mgr & Geol: John R Ellis
Prod: 100 tons

MAGNET COVE BARIUM CORP
Box 832, Greybull
Div Mgr: Lee Grenier
MINE, 8 mi E of Greybull surface, bentonite
Prod: 1500 tons
800-TON MILL, drying & grinding
Mill Supt: Frank Hinckley
(See Ark, Fla, Mo, Nev, Tex)

MILLER & FENTRESS MNG CO
Box 526, Hemingford Nebraska
SUN 1 & 2 MINES, Campbell Co, open pit, U_3O_8
Gen Mgr: Russell C Miller
No Prod
(See Nebr)

MILLER, RUSSELL C
Box 307, Hemingford
BRUCE MINES, open pit, U_3O_8
Mgr & Part Own: Russell C Miller
No Prod

MRAK, VERNON A
Box 68, Douglas
PAT 8 & 9, MNG LEASE
534 & EULALAH MANNING LEASE MINE, Converse Co, U_3O_8
MRAK PIT #1, undergr & open pit, U_3O_8
Mine Frm: Andrew Shifler
Prod: 50 tons
Under devel

NATIONAL LEAD CO, BAROID DIVISION
Box 1675, Houston 1, Tex
CLAY SPUR MINE, Box 122 Osage, open pit, bentonite
Gen Supt: J H Loth
DRY GRINDING MILL, Weston County
(See Ark, Calif, Colo, La, Mo, Mont, NY, SD, Tenn, Tex)

PETROTOMICS COMPANY (a partnership of Kerr-McGee, Tidewater Oil, Skelly Oil and Getty Oil)
Casper
Op Part: Tidewater Oil Co
SHIRLEY BASIN MINE, Shirley Basin, open pit, U_3O_8
Acting Gen Supt: Norman A Grant
Geol: Robert Cypert
Met: Emmerson Kemp
Under Devel

QUAD URANIUM CO
Hulett
Own: Ted R Wagner
THE QUAD URANIUM MINE Hulett, open pit, U_3O_8
Prod: 200 tons

REDLAND MNG EXPEDITION
Box 383, Thermopolis
DAY LEASE, Fremont Co, U_3O_8
SEC 3, LOTS 2 & 3, Fremont County, U_3O_8

SAN FRANCISCO CHEMICAL CO
Drawer F, Montpelier, Idaho
LEEFE MINE, 2 mi NW of Sage, surface, phosphate
Mine Supt: George Martz
Mine Frm: Frank Buck
Prod: 1,000 tons
(See Idaho, Utah)

SARGENT GEOCHEMICAL
629 E 4th St, Casper
Pres: John D Sargent
TRIX MINE, Pumpkin Buttes, open pit, U_3O_8
Gen Mgr: John D Sargent
Prod: 1 ton

SHIRLEY BASIN DEVEL CO
Box 882, Casper
Pres: Karl Meyers
VP: P Coupey
(Property in Shirley Basin under devel by Kerr-McGee Oil Inds, Federal Resources Corp & Hidden Splendor Mng Co)

J R SIMPLOT CO
Bank of Idaho Bldg
Box 2777, Boise, Idaho
Exploration for Ruby Co, Lander & Laramie, Fe, Green River, trona
(See Idaho, Mont)

SOUTH PASS, INC
630 Washakie, Lander
Pres: Paul A Chambers
VP: Charles R Swan
Sec-Treas: Irene Taylor
SOUTH PASS MINE, open pit, U_3O_8
Under devel

SPERBERG, JOHN J URANIUM MNG & EXPLORATION
2606 Chicago Avenue
Minneapolis 7, Minn
NORTH STAR MINE, open pit, U_3O_8
No Prod

STAUFFER CHEMICAL CO, WEST END CHEM DIV WINSTON BROS CO
Minneapolis
MINE, & PLANT, 21 mi NW of Green River, undergr, trona
Under devel

SUSQUEHANNA-WESTERN, INC
777 Grant St,
Denver 3, Colorado
Pres: Allen D Gray
VP & Treas: W H Hoadley
Purch Agt: P M Cheney
500-TON SOLVENT EXTRACTION MILL, Riverton, U_3O_8 ore
Mill Supt: R E Shreve
Frm: R L Beseda
(See Colo, SD)

TWIFORD MNG CO
801 South 6th, Douglas
D 21 MINE, Converse Co, open pit, U_3O_8

UNION CARBIDE NUCLEAR CO
Box 1049, Grand Junction, Colorado
Pres: L A Bliss
GLOBE & OTHER MINES, Gas Hills area, Fremont Co, undergr & open pit, U_3O_8
Gen Mgr: James L Lake
Asst Gen Mgr: J F Brenton
Mng Mgr: J F Emerson
Land Mgr: T S Ary
Mng Eng: J A Tavelli
(See Calif, Colo, Nev, NY, Utah; Globe Mng Co, Wyo)

URANIUM KING
Encampment
URANIUM KING MINE, Carbon Co, undergr, U_3O_8
Ch, mica, feldspar
BIG CREEK COPPER MINE, undergr, Cu
Under devel

U S STEEL CORP COLUMBIA-GENEVA STEEL DIVISION
120 Montgomery St
San Francisco, Calif
EXPLOR, west Wyoming near Atlantic City
(See Ala, Calif, Minn, Pa, Tenn, Utah)

UTAH CONSTRUCTION & MINING CO
550 California St
San Francisco, Calif
Mgr Uranium Oper: J S Anderson
LUCKY MC MINE, PO Box 831, Riverton, Gas Hills mng dist, 53 mi SE of Riverton, open pit, U_3O_8
Gen Mgr: M E Pratt
Geol: D C Anderson
Mech Eng: Ira McClune
Met: J E Pimentel
Mine Supt: S A Hottman
Mine Frm: N Sorensen
Mine Eng: J T Atkins
1,000-TON COLUMN ION EXCHANGE MILL, Gas Hills dist
Mill Supt: I Ritchie
Mill Frm: J J Myer
Assay: J B Stephenson
(See Calif, Utah)

UTAH MINING CORP
550 California St
San Francisco, Calif
Pres: A D Christensen
Exec VP & Gen Mgr: E W Littlefield
Sec: J M Horrigan
Treas: O L Dykstra
Mgr, Mng Oper: A M Wilson
SHIRLEY BASIN MINE, Box 627, Casper; mine 65 mi S of Casper, undergr, U_3O_8
Gen Mgr: J H Bailey
Mech Eng: Russ Cuillard
Mine Supt: M Tilley
Mine Eng: S Buda
(See, Utah Const & Mng Co, Calif, Utah, Wyo)

VITRO MINERALS CORP (SUBSID OF VITRO CORP OF AMERICA & ROCHESTER & PITTSBURGH COAL CO)
Wyoming div, 210 S Broadway, Riverton
MINE, Gas Hills, open pit, U_3O_8
Div Supt: Roy Coulson
Mine Frm: Primo Calabria
Mng Eng: C J Whitley
Geol: R D Adamson
Prod: 400 tons
(See Utah, NY)

WESTERN MNG CORP
108 S Third, Riverton
MARS #1 MINE, Natrona Co, U_3O_8

WESTERN NUCLEAR, INC
Exec Ofc: Suite 1420, 1700 Broadway, Denver 2, Colorado
Op Ofc: 507 W Spruce St, Rawlins
Pres: Robert W Adams
VP: W T Adams
Sec & Asst to Pres: J A Larson
Treas: Charles I Brown
Cont: Fred W Roecker
Purch Agt: W L McFarland
MINES, Jeffrey City, Crooks Gap, Gas Hills, Converse Co, open pit, U_3O_8
Mgr Oper: Joseph W Joyce
Dir of Research & Devel: P N Thomas
Ch Geol: Eric Newman
Gen Mine Supt: Don Cenis
Mine Prod Supts: Marcel Cenis, Kenneth Nobe
Mine Eng: Anthony Sutich
845-TON ACID LEACH-RIP MILL, Jeffrey City
Mill Supt: Marcelle H Smith
Mill Frm: Frank Robberson
Met: Henry Wilson
Mill Prod: 750 tons
(See Colo)

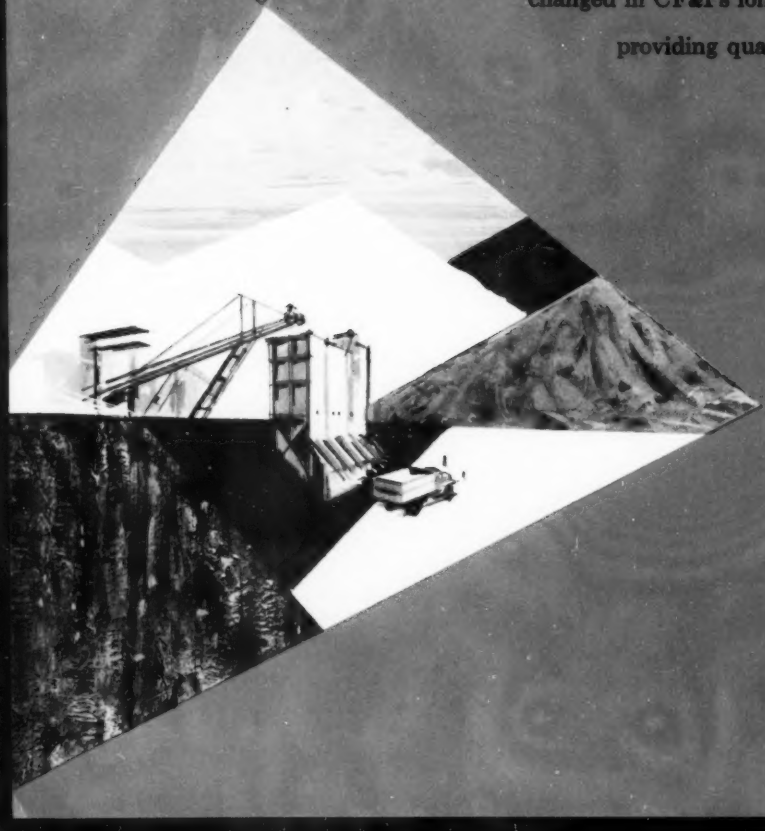
WESTERN URANIUM CORP
108 S 3rd, Riverton
Pres: J E Erickson
VP: J H Niemi
Sec-Treas: W Erickson
RIM MINE, Gas Hills, undergr & open pit, U_3O_8
Gen Mgr: W Erickson
Asst Gen Mgr: J Erickson
Mine Supts: Darrell Maluy, David Sigismund
Prod: 70 tons
STORM MINE, Hulett, open pit, U_3O_8

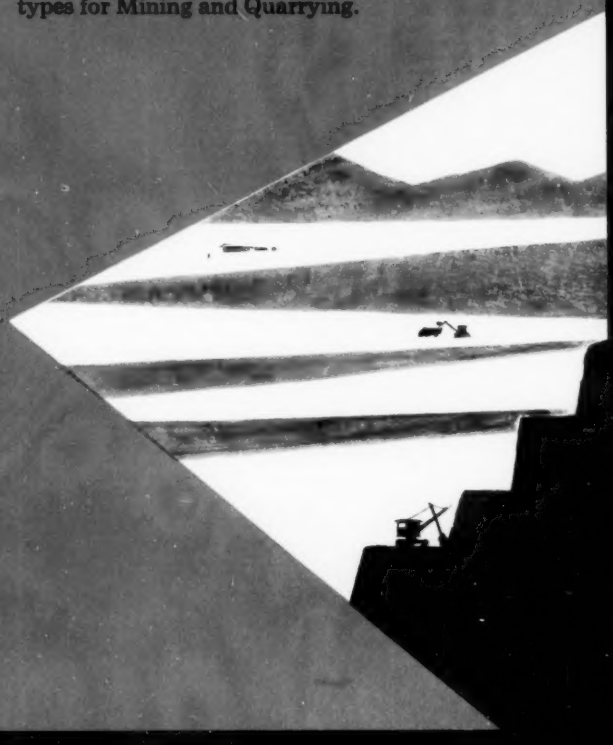
WYO-BEN PRODUCTS CO
Greybull
MINE, bentonite, open pit
grinding plant

CF&I

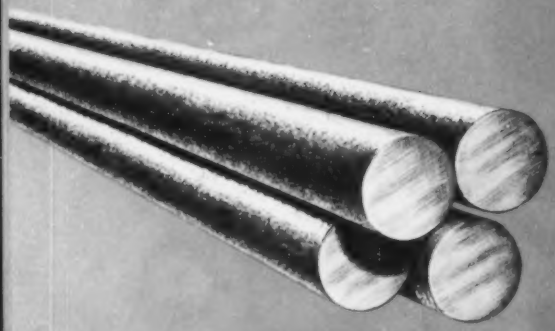
Steel Products are a tradition in Mining and Quarrying

Almost three-quarters of a century ago, The Colorado Fuel and Iron Corporation was established at Pueblo, Colorado, as the first steel manufacturer west of the Missouri River. Today, CF&I's plants, warehouses and sales offices stretch from coast to coast. But one thing has never changed in CF&I's long history—and that is its reputation for providing quality steel products of many different types for Mining and Quarrying.





CF&I steel products

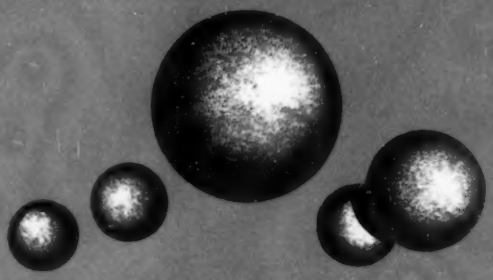


CF&I Grinding Rods

Hot-rolled of special, long-wearing steel which minimizes both bending and premature breaking. All rods are:

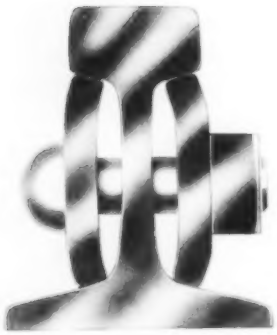
- square cut at the ends and cut to the exact length to fit the mill in which they operate.
- machine-straightened to assure maximum line contact between the rods and to eliminate tangling of the charge.

Grinding rods are available in diameters from 1½" to 4" in diameter (in increments of ½"), and in various lengths. Write for Catalog M160.



CF&I Grinding Balls

Hot-forged from special analysis alloy and carbon steels and then heat-treated to provide an ideal balance between hardness and toughness. This assures optimum grinding ability plus maximum wearability. CF&I Grinding Balls have high abrasion- and impact-resistance . . . provide best power utilization and operate economically in either high or low speed mills. Carbon steel balls are available in diameters from ¾" to 5"; alloy balls from 1½" to 4". Write for Catalog M162.



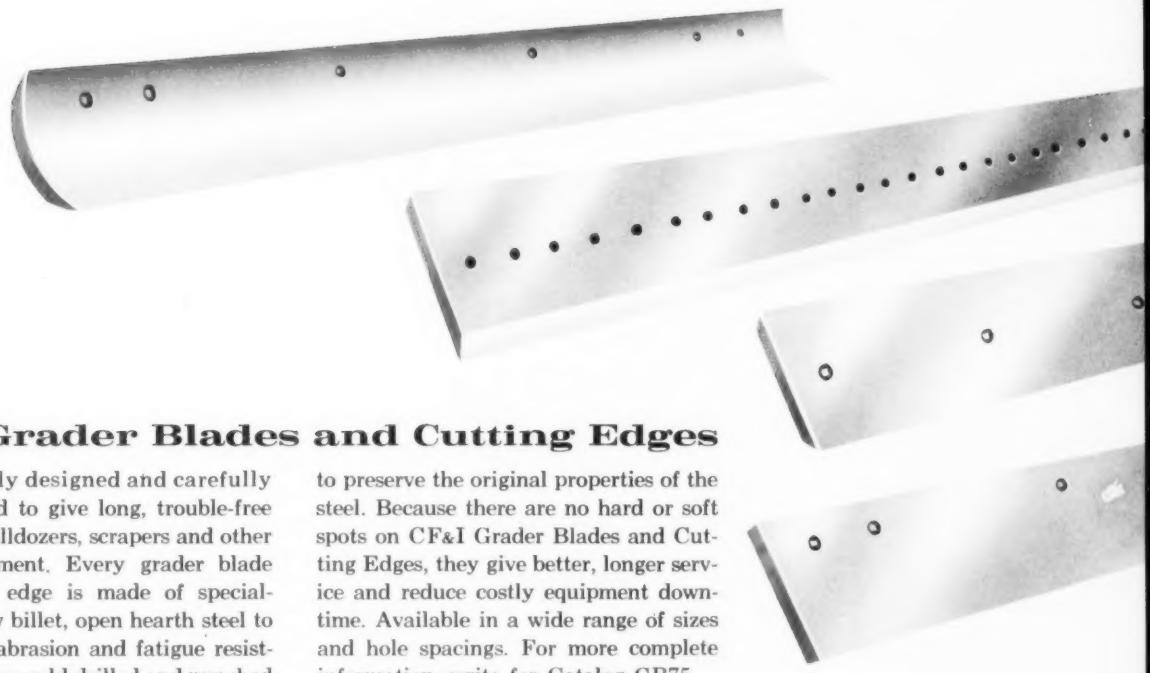
CF&I Mine Rails and Accessories

For generations, CF&I rails have been serving mines and ore-dressing plants. Made to meet ARA specifications, rails are available in a range of sizes from 12 to 45 pounds in weight, with a complete range of track fastenings including: splice bars, angle bars, track bolts and nuts (square or hexagon) and spikes. Standard rails are also offered. Write for Catalog M152.

CF&I Rock Bolts and Realock Metallic Fabric

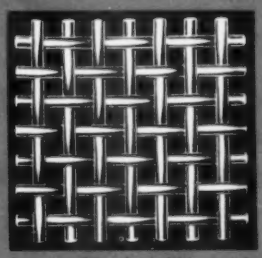
Reduces need for timbering and provides safe, economical support for underground mine openings. Rock bolts are available in either the Pattin expansion-shell type (¾", ⅝" and ⅞" in diameter) for easy installation, or in the 1" slot-and-wedge type. Realock Metallic Fabric gives important extra support between bolts, and is offered in a variety of gages, openings and widths. Write for Catalog M153.

for mining and quarrying

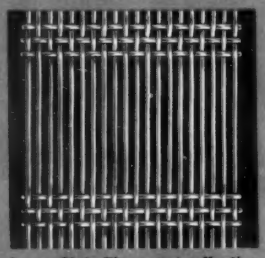


CF&I Grader Blades and Cutting Edges

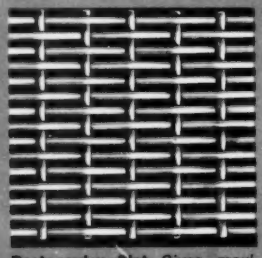
Scientifically designed and carefully manufactured to give long, trouble-free service on bulldozers, scrapers and other allied equipment. Every grader blade and cutting edge is made of special-analysis, new billet, open hearth steel to assure high abrasion and fatigue resistance. Holes are cold drilled and punched to preserve the original properties of the steel. Because there are no hard or soft spots on CF&I Grader Blades and Cutting Edges, they give better, longer service and reduce costly equipment down-time. Available in a wide range of sizes and hole spacings. For more complete information, write for Catalog GB75.



Square Opening—This basic construction provides the most accurate screening with a wide range of open areas and wire sizes.



Long Slot—The most effective non-blinding type of construction. The high percentage of open area results in a correspondingly high tonnage screen capacity.



Rectangular Slot—Gives maximum through capacity with some sacrifice of separation accuracy and considerable freedom from clogging or blinding.

Double Crimp—In this construction of wire cloth, both warp and fill wires have equal crimp and receive an equal share of wear from material passing over and through.

CF&I Space Screens

Available in *all types* to meet standard or special requirements. You have your choice of:

- metals—high carbon, oil tempered and stainless steel plus many others. For maximum abrasion and fatigue-resistance—specify oil tempered wire.
- effective open areas and openings.
- weaves and crimps; hooking and edge preparations.

Thus, whether you demand absolute accuracy, long-life or maximum through-put, there's a CF&I Space Screen to give you economical, efficient screening. For complete information, write for Catalog MS661 Rev.

CF&I-Wickwire's
DOUBLE GRAY-X®

In an extended series of tests at our Palmer Plant, five brands of wire rope—all made by major manufacturers—were tested on a 25,000-lb. fatigue-testing machine that punishes wire rope to destruction by bending it back and forth over sheaves.

As the chart indicates, Double Gray-X lasted longer than the other four ropes at all three safety factors used. And at the highest and most commonly-used safety factor, it lasted 45%* longer than the average of the other ropes.

Double Gray-X lasts longer because it's the result of a new development in wire drawing technique. The use of molybdenum disulphide in this process produces these outstanding fatigue-resistance factors:

- A molecular shield which prevents the wires from grinding together as the rope operates.
- Smoother wire surface which provides better fatigue resistance.
- Extra toughness because molybdenum disulphide helps preserve the inherent toughness of the wire during drawing.

Because it lasts longer on even the toughest jobs, Double Gray-X lowers your wire-rope investment and drastically reduces costly equipment downtime. It's especially recommended for:

Drag Line Excavators (For Stripping):

Drag Lines (up through ¾") 6 x 19 Seale, Wisscolay, Double Gray-X, Lang Lay, IWRC. (⅞" through 1⅝") 6 x 21 FW, Wisscolay, Double Gray-X, Lang Lay, IWRC. (1¾" and larger) 6 x 25 FW, Wisscolay, Double Gray-X, Lang Lay, IWRC.

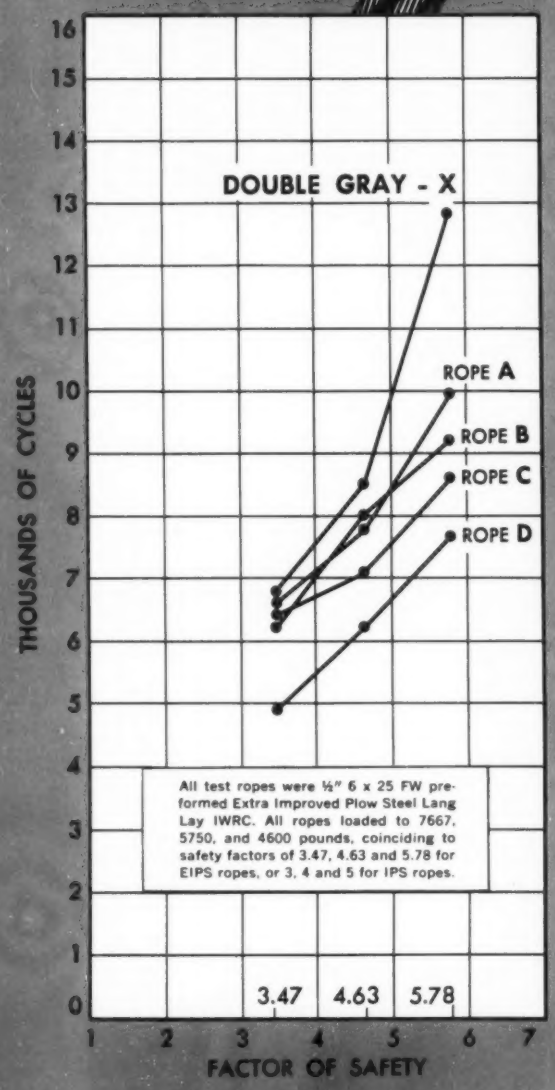
Shovels:

Hoist Lines (up through ⅝") 6 x 25 FW, Wisscolay, Double Gray-X, Reg. Lay, IWRC. (¾"-1⅛") 6 x 25 FW, Wisscolay, Double Gray-X, Lang Lay, IWRC. (1¼" and larger) 6 x 41 FW, Wisscolay, Double Gray-X, Lang Lay, IWRC.

Drag Scrapers (Sauerman Type):

Drag or Inhaul Lines and Tail or Haulback Lines (¾" and smaller) 6 x 19 Seale, Wisscolay, Double Gray-X, Lang Lay, IWRC (⅞" and larger) 6 x 21 FW, Wisscolay, Double Gray-X, Lang Lay, IWRC.

*Percentage above average of all other wire ropes tested at safety factor of 5.78.

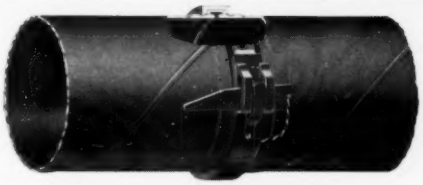


For complete information on CF&I Steel Products for the Mining Industry, contact your nearby CF&I sales office or distributor. Write for Catalog WR781.

The Colorado Fuel and Iron Corporation

ARIZONA—Phoenix • ARKANSAS—Little Rock • CALIFORNIA—Los Angeles, Oakland, Sacramento, San Francisco, San Leandro • COLORADO—Denver (General Offices), Pueblo • GEORGIA—Atlanta • ILLINOIS—Chicago • KANSAS—Wichita • MASSACHUSETTS—Boston, Palmer • MICHIGAN—Detroit • MISSOURI—North Kansas City • MONTANA—Billings • NEW JERSEY—Clifton (New York District Sales) • NEW MEXICO—Albuquerque, Farmington • NEW YORK—Buffalo, New York (Executive Offices) • OKLAHOMA—Oklahoma City, Tulsa • OREGON—Portland • PENNSYLVANIA—Philadelphia • TEXAS—Amarillo, El Paso, Ft. Worth, Houston, Odessa • UTAH—Salt Lake City • WASHINGTON—Seattle, Spokane

HOW TO TAKE TIME AND WORK OUT OF PIPE LINE INSTALLATION



NAYLOR Wedgelock couplings make a positive connection, securely anchored in standard weight grooved ends.

To help you get the job done faster, easier and more economically, NAYLOR offers a pipe and coupling combination to simplify pipe line installations.

NAYLOR's exclusive lockseamed, spiral-welded structure gives you pipe that is light in weight without sacrifice of strength and safety. It's easy to transport, handle and install—saves time, trouble and money right down the line.

WEDGELOCK couplings fit into this economy picture, too. They simplify and speed connections since a hammer is the only tool required to connect or disconnect them, and joints can be made up with only one side of the pipe in the open.

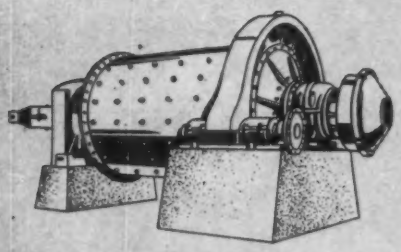
Whether it's air, water, tailings or ventilating service, it will pay you to look into this dependable combination.

Write for Bulletin No. 59

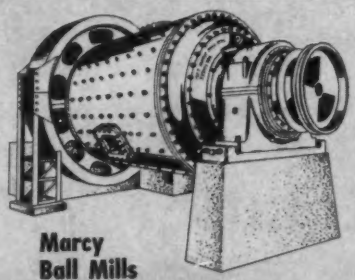
NAYLOR PIPE *Company*

1242 East 92nd Street, Chicago 19, Illinois

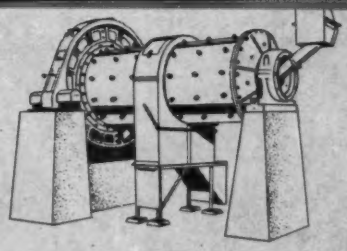
Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.



Marcy Rod Mills



Marcy Ball Mills



Marcy CPD Rod Mills

Proved and Improved ore-milling equipment by MINE & SMELTER

Marcy Grinding Mills

Applications

Grinding materials 1½" or finer to a product as fine as 325 mesh; materials such as metallic ores, industrial minerals, specification sands, cement, brick, lime, coke, clay, chemicals, fibrous materials.
Wet or dry grinding. Open or closed circuit.

Types

Grate discharge & overflow type ball mills.
Open end rod mills.
Center and end peripheral discharge rod mills.
Tube mills — Pebble mills
Acid-proof mills — Batch mills

Sizes

29 different diameter sizes, from 12" to 12'6" inside diameter.

Capacities

Up to 6650 tons per 24 hours per mill

Skinner Furnaces

Applications

Roasting molydenum sulphide concentrates; roasting uranium-vanadium ores; drying uranium oxide precipitate; decomposition of oil sludge; lime burning; drying copper concentrates; roasting zinc ores; manganese reduction; dehydration of alunite; calcining of basic alum, lime sludges, clays, foundry sands, carbon, etc.; incineration of sewage.

Types

The Skinner is a cylindrical, multiple hearth type furnace, providing maximum flexibility, minimum dust losses, and the advantage of being able to handle sticky materials.
Gas, oil or coal fired.

Sizes

2 to 12 hearths
4'0" to 23'6" inside diameter
22 to 4000 sq. ft. hearth area

Massco-Grigsby Pinch Valves

Applications

For handling corrosive and abrasive pulps and liquids; and where remote control and/or automatic regulations are desired.

Types

Available with rubber, neoprene, or specially compounded rubber sleeves.
Manual and power driven closing mechanisms.
Can be equipped for remote control and automatic regulation.

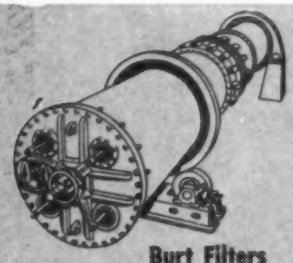
Sizes

1" to 14" inside diameter.

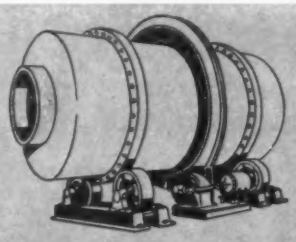
Capacities

Pressures to 150 psi.
Temperatures to 200° F.

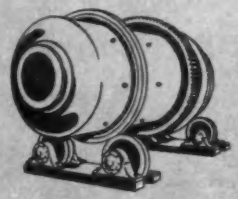
Specialized engineering and laboratory testing services available for ore-milling problems.



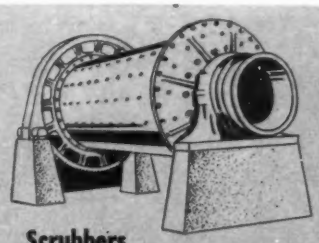
Burt Filters



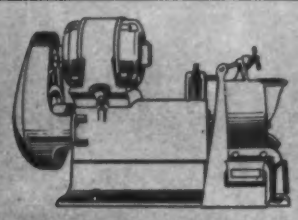
Fusion Furnaces



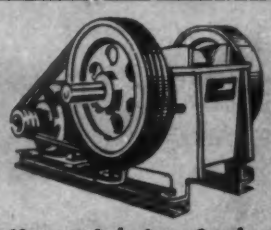
Leaching Drums



Scrubbers



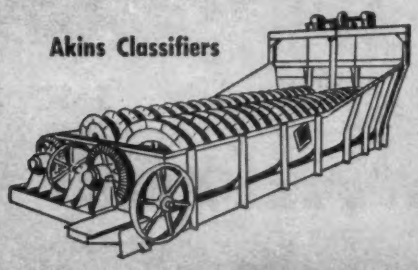
Massco-McCool Pulverizer



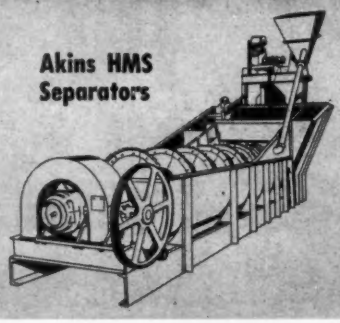
Massco Lab Jaw Crusher

Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England and South Africa.

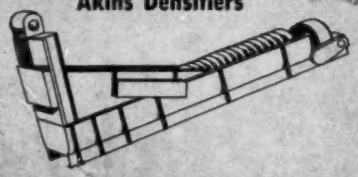
Sales Agents in Mexico, Chile, Peru, Philippine Islands, Japan, New York City (for Continental Europe), and in the principal cities of the United States.



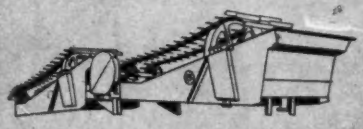
Akins Classifiers



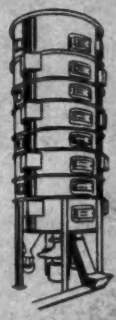
Akins HMS Separators



Akins Densifiers



Esperanza Drag Classifiers



Skinner Roasters and Dryers

Wilfley Tables

Akins Classifiers

Applications

Classification of solids by size and/or gravity.
Dewatering.
Washing ore, coal, oyster shell, sand and gravel.
Desliming and deoiling phosphate rock and concentrate.

Types

Standard, simplex and duplex, for size separation, or dewatering, of coarse material.
Submerged spiral, simplex or duplex, with large pool, for separation of finer sizes.
Flared tank units provide maximum setting area and reduced overflow velocity.
Special units for handling acid or caustic solutions and salt brines.
Lifter bars and spray water box arrangements are available for difficult washing problems.

Sizes

12" to 84" spiral diameter, simplex and duplex.

Capacities

Sand raking capacity: up to 7860 tons per 24 hours (Duplex machine)
Overflow capacity: up to 2386 tons per 24 hours (Duplex machine)

Akins Heavy Media Separators

Applications

Any material that is amenable to heavy media separation of its components, such as coal, iron, manganese, fluorspar, chrome, lead-copper, tungsten, garnet, topaz, gravel.

Types

The two basic types of Akins Separators are modifications of the standard and submerged spiral Akins Classifiers.

Sizes

Spiral-diameter sizes from 12" to 84".

Capacities

Sink: up to 230 tons per hour.
Float and middling: up to 290 tons per hour.

Akins Heavy Media Densifiers

Applications

Used for recovering and cleaning medium solids.

Types

The Akins Densifier is a modification of the submerged spiral Akins Classifier.

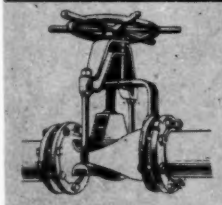
Sizes

Spiral-diameter sizes from 16" to 66".

Capacities

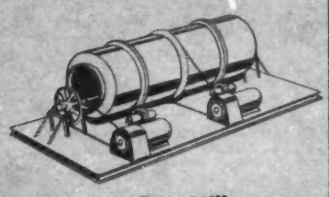
Raking capacities up to 49.5 tons per hour.

For Complete Information ...on these and other *Proved and Improved* **Mine and Smelter products, write for catalogs.**

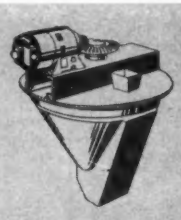


Massco-Grigsby Rubber Pinch Valves

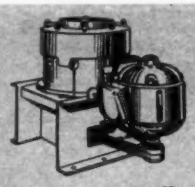
Marcy Pulp Density Scale



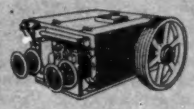
Pug Mills



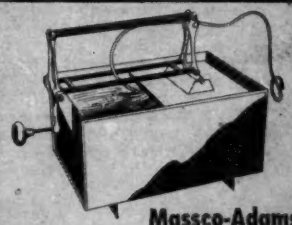
Vezin Sampler



Massco Gy-Roll Reduction Crusher



Lab Crushing Rolls



Massco-Adams Reagent Feeder

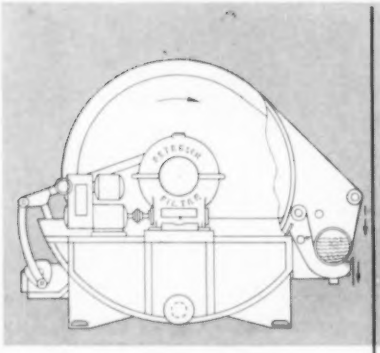
The Company that cares enough to give you the best!

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

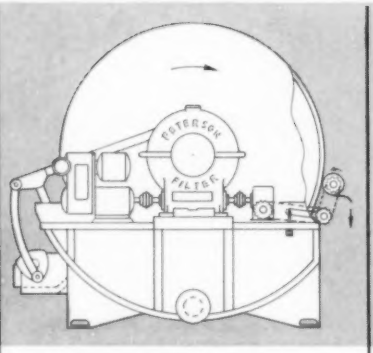
DENVER 16 — 3800 RACE STREET
NEW YORK 17 — 122 E. 42nd STREET
SALT LAKE CITY 1 — 121 W. 2nd S.
EL PASO — 1515 11th AVE.
ALBUQUERQUE — 701 HAINES N.W.

PETERSON DRUM FILTERS



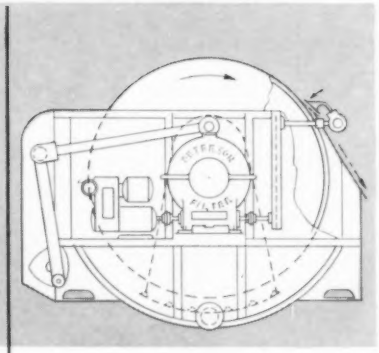
PETERSON C.d. (CLOTH DISCHARGE)

For thin cake discharge and or severe blinding from salting out in cloth. Cloth can be cleaned by sprays or chemicals with no filter shutdown. The cloth is spread, kept in tension and lateral cloth movement sensed and corrected by a Fluid Tension Roller . . . for reliable gadget-free tracking. Available in pilot units 2'x1.5' at 10 sq. ft. to 14'x18' at 792 sq. ft.



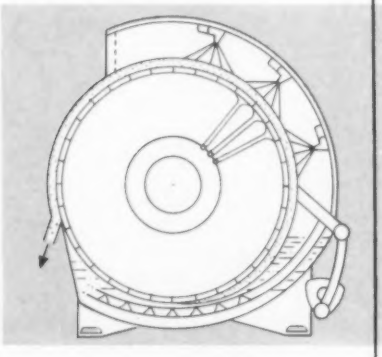
PETERSON FLOATING ROLLER DISCHARGE

For thin and sticky cake discharge where cloth binding isn't severe. A polished stainless steel roller which is synchronized to the speed of the drum, picks up the sticky cake and is scraped clean. The roller is floated to prevent damaging pressure on grids or cloth from variations in drum or cake thickness. Available in pilot units 2'x1.5' at 10 sq. ft. to 14'x24' at 1056 sq. ft.



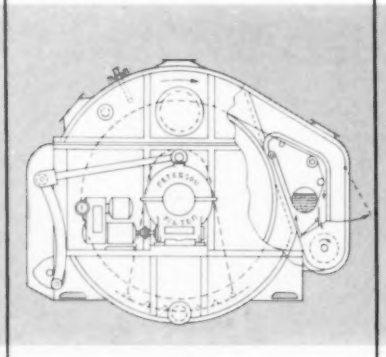
PETERSON "CONTINU-COAT"® FILTER

For clarifying very dilute slurries when film like or very compressible cakes are desired. A 3 to 4 inch precoat of filter aid is built up, then a precision scraper blade advances to shave off thin film of precoat plus the cake, exposing new unblinded precoat each revolution. Available in pilot units 2'x1.5' at 10 sq. ft. to 10'x16' at 503 sq. ft.



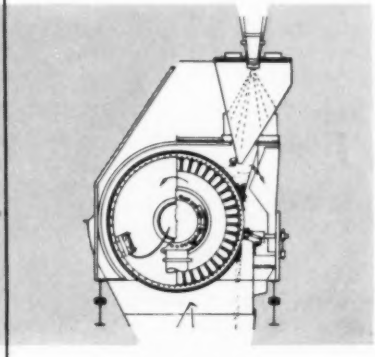
PETERSON HIVELO® SALT FILTER

For multiple series washing on relatively fast filtering salt-like products. The Hivelo (High Velocity) drum has 40 panels and a large diameter valve so that intermixing of filtrate is minimized; hence, a sharp separation can be made between either the strong mother liquor or series wash liquors. Available in pilot units 4'x1' at 25 sq. ft. to 8'x12' at 300 sq. ft.



PETERSON HIVELO® C.d. (CLOTH DISCHARGE)

For direct filtration of slurries which deteriorate during retention in gravity thickeners. Fast drum speeds, up to 2 RPM, at 60% submergence allows ultimate filtrate capacity. A sluice arrangement gives reliable discharge of the resulting film cakes. Hivelo designs assures minimum pressure drops at high flow rates. Available in pilot units 2'x1.5' at 10 sq. ft., 4' dia., 6' dia., 8' dia. and 10' dia.x16 face at 503 sq. ft.



PETERSON TFR TOP FEED RESERVOIR

For fast filtering products which cannot be kept in suspension by agitation – 6" cakes are common. The only top feed filter with a reservoir and overflow which allows a 100% overload without spill into cake discharge. Seal Lock Scrapers prevent blow back. Hivelo design for high flow rates with minimum pressure drop and abrasion of internals. Available with high frequency vibration to compact cake. Available in pilot units 3'x1' at 10 sq. ft. to 8'x12' at 300 sq. ft.

PETERSON FILTERS U.S.A.

Viking Mark Drum Cloths and Disc Filter Bags

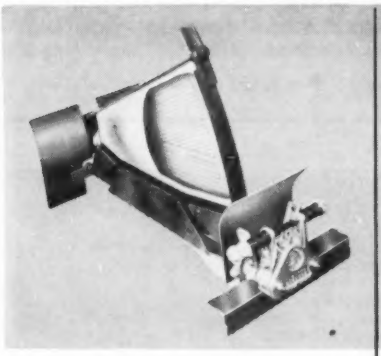
MATERIALS OF CONSTRUCTION

Peterson Filters are available in a wide variety of materials, ranging from special alloy steels to copper aluminum alloys, from wood with rubber nails to rubber covered or plastic.

TESTING LAB

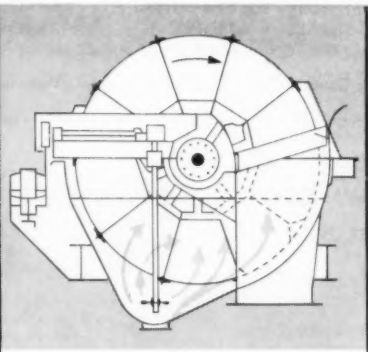
Complete facilities for testing and reports. Write for data sheet giving instructions for sending samples.

PETERSON DISC FILTERS



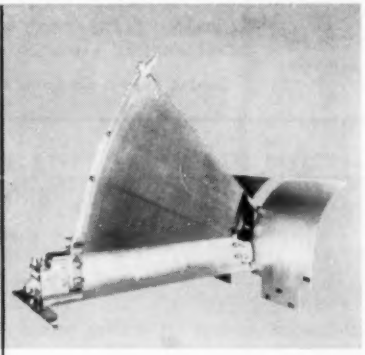
PETERSON "CONTOUR" DISC FILTER

For cake discharge as thin as ⅛". The Contour Scraper gently contours to the bellow of the bag and discharges all of the cake, regardless of cake thickness. Contour disc filter's ability to discharge thin cake, in many cases, enable them to be more economically used than Drum Filters since they provide four to six times more filter area per square foot of floor space. Available in pilot units 3'x1' at 10 sq. ft. to 12'6"x14' at 3080 sq. ft.



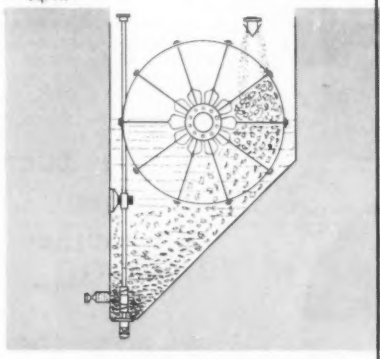
PETERSON TPA DISC FILTERS (Top-Entering Propeller Agitation)

For heavy fast settling products or fine products with oversize particles. TPA eliminates tank glands, the propeller has a gentle boiling action, with maximum agitation at the bottom of the tank. Tank configuration prevents solids buildup which eventually sloughs in and stalls conventional log paddle type agitators. Available in all sizes. Standard TPA models are from ½ HP to 7.5 HP.



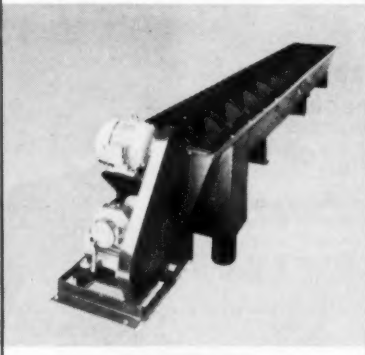
PETERSON "DUAL GUIDE" DISC FILTER

For high cake tonnage with permissible solids in filtrate, or a fiberous product so that wire mesh filter cloth can be used. The Dual Guide scraper has two guides which provide close but positive clearance between the disc and the edge of the scraper blade. Cakes as thin as ¼" can be completely discharged without wire cloth damage. Available in pilot units 3'x1' at 10 sq. ft. up to 12' 6"x14' at 3080 sq. ft.



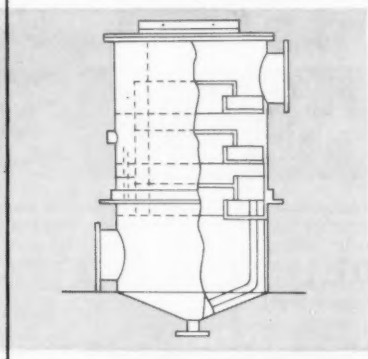
PETERSON "ROTO-DISC"® THICKENER

For thickening slurries from a few per cent solids to a thick, slow flowing plastic magma. Incoming feed cascades over half submerged discs during cake discharge. The cake has been loosened by blow back pressure and the incoming feed peels it from the sectors. These slab cakes settle rapidly and are blended with the coarse unfiltered particles which settle to the bottom of the tank. Available in pilot units 3'x2' at 20 sq. ft. to 12' 6"x14' disc. at 3080 sq. ft.



ACCESSORIES PETERSON CONVEYOR-TYPE REPULPERS

For repulping cakes discharged from either disc or drum filters. Broken flights convey material either to the center or to either end of the trough and at the same time repulp the cake. Where increased holding and repulp time is required, a large size is selected to eliminate full submergence which require stuffing boxes. Sealed types for totally enclosed hooded filters are also available. Available in sizes from 12" dia.x4' lg. to 28" dia.x24' lg.



PETERSON CONTACT CONDENSER/SCRUBBERS

For condensing and or scrubbing air streams in vacuum systems. In the bubble tray type the trays are interlocked so that all of the air must pass through the water, thereby assuring maximum efficiency for minimum cooling water. An inverted bonnet-type requiring larger amounts of cooling or scrubber water and a complete line of vacuum system accessories, receivers, pumps and blowers are also available.

All units can be totally enclosed with hoods for various degrees of tightness such as solvent recovery.

Write for complete data sheets on any or all products listed.

PETERSON FILTERS

AND ENGINEERING COMPANY

P. O. BOX 606 • 1949 SOUTH 2nd WEST STREET • SALT LAKE CITY 10, UTAH

Manufacturers' Agents in Principal Cities.

GOODALL RUBBER COMPANY

EST. 1870

GENERAL OFFICES, MILLS and EXPORT DIVISION: 430 WHITEHEAD ROAD, TRENTON 4, N. J.

BRANCHES: PHILADELPHIA • NEW YORK • BOSTON • PITTSBURGH • BUFFALO • CLEVELAND • INDIANAPOLIS • CHICAGO
DETROIT • KANSAS CITY • ST. PAUL • LOS ANGELES • SAN FRANCISCO • SEATTLE • SPOKANE • PORTLAND
SALT LAKE CITY • DENVER • HOUSTON • MILWAUKEE • ATLANTA • CHARLOTTE • STUART and MIAMI, FLA.

Goodall Rubber Company of Canada, Ltd., Toronto, Montreal, Vancouver *Distributors in Other Principal Cities.*

"BROWN CORD"
AIR HOSE
Sizes ½" to 1", I.D.

A molded-and-braided hose for drilling, riveting, and other general pneumatic tool service. Tube, carcass and cover are combined to assure great strength and durability, without impairing flexibility and easy handling. Oilproof tube; rubber cover. Available in lengths up to 500 feet.

"SUBWAY"®
AIR HOSE
"Standard of Quality"
Sizes ½" to 1¼", I.D.

Another Goodall "Standard of Quality" hose especially built for rock drilling and all other heavy-duty air tool work. Light weight, flexible, easy to handle. Tough, oil-proof black "Synplastic" tube; highest quality wrapped duck carcass; wear- and weather-resistant red rubber cover, with yellow criss-cross stripe. Maximum lengths of 50 feet.

"HARDROK"®
WIRE BRAID AIR HOSE
"Standard of Quality"

A super-hose for rock drills in construction, quarrying, mining and any other heavy-duty air service. Longwearing, oilproof "Synplastic" tube; horizontally braided steel wire carcass; tough yellow rubber cover, with black spiral stripe for identification. Light in weight, extremely flexible. Sizes ¼" to 3", inclusive; two and three braid.

"NEWTYPE"
SUCTION AND DISCHARGE HOSE
"Standard of Quality"

Patented wire-reinforced, woven cord construction gives "Newtype" unusual strength and durability for both suction and discharge. Light weight, extremely flexible. Cannot kink, buckle or collapse, yet if accidentally crushed, can be quickly rounded into shape again without harm. Smooth bore. Sizes 1" to 4", I.D. Max. lengths of 50 feet. Black cover, green spiral stripe.

"BUCKSKIN"
WATER HOSE
"Standard of Quality"
Sizes ½" to 4", I.D.

Long famous for quality and reliability in every water hose service. Tube is of slow-aging rubber stock—tough and pliable. Strong rubber cover withstands roughest surface wear and abuse, and affords maximum protection to cotton duck carcass from contact with moisture. Maximum lengths of 50 feet.

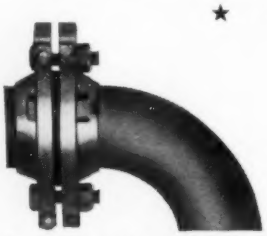
"INFERNO"®
STEAM HOSE
"Standard of Quality"
Sizes ½" to 2½", I.D.

Built with multiple-layer wire braid carcass, heat-resistant tube and tough, abrasive-resistant red rubber cover with black spiral stripe for easy identification. Wire braids will cause steam to be diffused from damaged hose, providing a safety factor against sudden burst. Extremely flexible. Recommended for pressure up to 200 lbs., and temperatures up to 400° F. Maximum lengths of 50 feet.

"ALLSERV"
General Purpose HOSE

For all types of pneumatic tools—also water, oil, chemicals, gasoline, paint spray, etc. A very flexible all-"Synplastic" molded-and-braided hose, in one, two or three braid construction, with tough wear-resistant red cover. Sizes ¼" to 1½", for working pressures from 200 lbs. to 300 lbs.

★ ★ ★



"KEMITE" DUCT WITH "FLANG-LOK"
Floating Flanges

For mine suction and discharge. Tube offers highest resistance to abrasive wear. Wire-reinforced carcass will not kink or collapse. Cover is tough, long-wearing rubber compound. Generally furnished with "Flang-Lok" Ends, to accommodate "Flang-Lok" Flanges. Sizes up to 4", I.D.

"FLANG-LOK" FLANGES provide the most convenient and efficient method of connecting "Kemite" Duct, effecting a leakproof, rubber-to-rubber seal, and permitting full flow. For bolt alignment, flanges turn independently of the duct or pipe. No gaskets or washers. All sizes.

"GOODITE" FLEXIBLE PIPE. Same construction and advantages as "Kemite" Duct, above, but available in larger sizes—up to 12", I.D.

PLASTIC PIPE and FITTINGS

Goodall manufacturers a complete line of Plastic Pipe—Polyethylene, A.B.S. and P.V.C.—to meet every requirement. All are produced under conditions assuring the highest degree of quality and uniformity.

POLYETHYLENE. (Flexible). Four brands, each with specific characteristics: "Long-Life Good-Flex". Type I. "Long-Life Super-Flex". Type II. "Long-Life Lite-Flex". Type III. All Schedule 40, 75 lb. and 100 lb. N.S.F. Approved. "Spartan". Schedule 40, 75 lb. and 100 lb. For industrial services.

A.B.S. (Semi-Rigid). "Goodline". Type I. S.W.P.-N.P. 100 and 150; I.P.S. Schedule 80. N.S.F. Approved.

P.V.C. (Rigid). "Chem-King". Type I. Normal impact "Power-King". Type II. High-impact.

The GOODALL Trademark on hose, belting, boots and clothing for the Mining Industry represents a standard of quality and reliability established through ninety-one years of manufacturing experience, backed by continuing research and development. Product specifications are based on first-hand knowledge of mine service requirements, with selected materials, expert craftsmanship and careful inspection assuring the utmost in on-the-job performance and economy.

GOODALL RUBBER COMPANY

EST. 1870

CONVEYOR BELTING

"SUPER TRIPLE-S." Goodall's finest grade. Heavy duck carcass, high tensile rubber covers and strong friction between plies. Designed to carry run-o-mine coal, ores, slag and crushed limestone up to 10", wet or dry. Widths up to 48".

"TRIPLE-S." Same superior quality as "Super Triple-S," but of somewhat lighter construction. Widths up to 48".

"GOODALL." The *right* belt for the great number of lighter conveying jobs where the *extra* qualities of "Super Triple-S" and "Triple-S" are not required. For sized coal, crushed stone, gravel, shells, ashes, etc. Widths up to 48".

ELEVATOR BELTING

"SUPER TRIPLE-S," "TRIPLE-S" and "LA CROSSE" are long-established Goodall brands, built to specifications that assure reliable, economical service under conditions for which each is designed. "La Crosse" made in widths up to 30", others to 48". Available with extra features—punching, stitching, endless—if desired.

"LONG-LIFE" TENSILIZED NYLON CONVEYOR BELTING

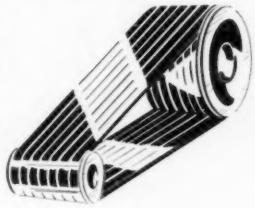
Guaranteed to last much longer than the best belting you have ever used for handling roughest, heaviest loads. Two-ply Tensilized Nylon carcass stronger than five-ply carcass of heavy duty belt duck.

"POWER KING" TRANSMISSION BELTING

Friction surface, raw edge construction, especially built for most severe service. Minimum stretch and firm contact with pulleys at high speeds. Highest quality skim friction between plies. 35 oz. silver duck.

"POWER KING" High-Capacity V-BELTS

Built with larger, stronger, endless twin grommets to transmit greater H.P.. Fewer belts per drive, reduction in over-all weight, less space required for any load. Only high-capacity belts with so little stretch that efficiency of drive is not affected. Greater flexibility gives one-third more gripping power than other types.



★ ★ ★

PUMP DIAPHRAGMS
PUMP VALVES
PISTON PACKING
ASBESTOS PACKING
RUBBER SHEET PACKING
RUBBER & DUCK PACKING
CHUTE LINING
EXPANSION JOINTS
FIRE HOSE
HOSE COUPLINGS, CLAMPS
LIQUID CORROSION-RESISTANT LININGS

GOODALL WATERPROOF FOOTWEAR and CLOTHING

Famous for Quality, Comfort and Long Wear

"TOE-SAVER"® BOOTS

Smooth, tough, flexible jet black rubber, heavy duck lined. Cushion insole. White cap over reinforced steel toe tested to withstand 2,000 lbs. pressure. Tire-tread soles. Hip, Style MB346. Storm King, Style MB780. Short, Style MB946.

"WEAR KING"® BOOTS—Identical in quality with above, but without "Toe-Saver." Hip, Style MB345. Storm King, Style MB799. Short, Style MB945.

"RUBBERHIDE" SAFETY INNERSOLES. Sheet of high-tensile spring steel bonded between layer of top grade sole leather and layer of rubberized canvas duck. Puncture-proof.

MINER'S PACS Top quality black rubber Lace Pacs, Style ML-975, 16" high; Style ML-760, 15" high. Cushion insole. Cleated outsole. "Toe-Saver" Safety Toe. Also non-lace "Terra Haute" pacs, Style ML-271, in otherwise same construction. Other boots, workshoes, arctics and rubbers, built for extra wear and comfort.

COATS, JACKETS, OVERALLS

Items too numerous to describe here, in rubber, oiled and latex . . . all designed to afford maximum protection plus comfort in every kind of work. Style 338 coat is a long-time favorite . . . double back; corduroy-lined collar; length 49".

SAFETY HATS

"Hardboiled" Safety Hats in fibre glass and aluminum. Easiest to wear, yet providing maximum protection. Also, miners' caps, with or without lamp brackets.

TUNNEL SUITS

Style 80 jacket with Style 81 Overall makes the ideal suit for underground work. Other suit combinations to meet every preference or need.

★ ★ ★

Write for catalog describing the complete Goodall clothing and footwear line.

World-wide answer to international procurement problems.....

DORR-OLIVER EQUIPMENT and ENGINEERING SERVICES

The world-wide facilities of the Dorr-Oliver organization can offer you maximum flexibility in service, delivery and equipment costs. With associated companies in ten countries, and with manufacturing facilities in twenty countries, Dorr-Oliver can find the answers to most problems of currency, shipping or customs.

Dorr-Oliver representatives in almost every major international center are competent to give you on-the-spot technical assistance with design, operating or construction questions. And full cooperation between the various components of the Dorr-Oliver organization assures you the most efficient, and often the most economical solution to your problem.

For full information on Dorr-Oliver equipment and services, call your nearest representative—or write Dorr-Oliver Incorporated, Stamford, Connecticut, U.S.A.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

DORR-OLIVER COMPANIES

AUSTRALIA
Dorr-Oliver Pty., Ltd.
69 Chandos Street, St. Leonards, New South Wales
Park Lake, 171 Fitzroy Street, St. Kilda, Victoria

BELGIUM
Dorr-Oliver S.A.
Boulevard de Berlaimont, 6, Brussels 1

CANADA
Dorr-Oliver-Long Ltd.
Orillia, Ontario

FRANCE
Dorr-Oliver S. a. R. L.
8 Rue Bellini, Paris 16e

GERMANY
Dorr-Oliver G.m.b.H.
Gustav-Freytag-Str. 9, Wiesbaden

GREAT BRITAIN
Dorr-Oliver Company Limited
Norfolk House, Wellesley Rd., Croydon, Surrey

INDIA
Dorr-Oliver (India), Limited, "International"
16 Queen's Road Estate, Bombay 1

ITALY
Dorr-Oliver S. p. A.
Corso Matteotti 3, Milan

NETHERLANDS
Dorr-Oliver N.V.
Apollolaan 143
Amsterdam-Z

UNITED STATES
Dorr-Oliver Incorporated
77 Havemeyer Lane, Stamford, Connecticut

DORR-OLIVER REPRESENTATIVES

ARGENTINA
Cemac, S.A.
Paseo Colón 528(R-1)
Buenos Aires

AUSTRIA
GEPIA.
Prinz Eugen Str. 30
Vienna IV

BRAZIL
Sociedade Tecnica e Comercial Serva Ribeiro S/A
Rua Florencio de Abreu 779, Sao Paulo
Avenida Rio Branco 8°-9° andar, Rio de Janeiro

COLOMBIA
Jorge Triana y Cia.
Apartado de Correo No. 5
Bogota

CUBA
J. C. Tarafa
P.O. Box 3478, Havana

DENMARK
Dano, Engineers and Machine Shop
Buddinge Works, Copenhagen

FINLAND
Ekstroms Maskinaffar A.B.
Postbox 310, Helsinki

JAPAN
Sanki Engineering Co., Ltd.
Sanshin Building, Hibiya, Tokyo

PHILIPPINES
The Earnshaw Docks & Honolulu Iron Works Company
P.O. Box 282
Tacoma & Second Streets, Port Area, Manila

PUERTO RICO
Abarca Warehouses Corp.
P.O. Box 2352, San Juan 10

SOUTH AFRICA
Edward L. Bateman, Ltd.
Founders Building
34 Ameshoff Street, Braamfontein, Johannesburg

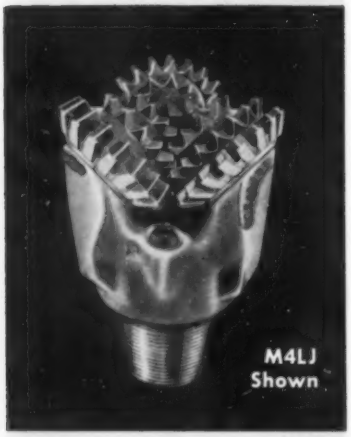
SPAIN
La Promotora Industrial S.A.
Rambia de Cataluña 6, Atico, Barcelona 7

SWEDEN
Hedemora Verkstader A. B.
Hedemora

VENEZUELA
John Lindsay, Sucra, S.A.
Edif. GALIPAN
Caracas, Venezuela

RESEARCH & TESTING LABORATORIES

WESTPORT, CONN.
FOREST HILL, LONDON, ENGLAND
AMSTERDAM, THE NETHERLANDS



For Lowest Drilling Costs, Specify...

Security®

SUPER-AIRE

BLAST HOLE BITS

for your drilling requirements

S SERIES — For Soft Formations* Designed to effectively drill the complete range of softer formations . . . shales, soft sandstone, soft limestone. Maximum offset of cones for greatest twisting — tearing action and long teeth assure fastest penetration rates. Self-cleaning action of cutter designs and placement of air courses prevent balling up and permit rapid removal of loose particles from bottom of hole.

M SERIES — For Medium Formations* General purpose bits for fast drilling of medium hard limestone, shaley limestone and other medium formations. Moderate offset is employed to increase penetration rates. Additional gage protection is provided by "T" tooth designs where formations are abrasive. Special cutter features, combined with sturdy tooth design, of these versatile bits, offer greater strength to withstand heavier drilling weights in harder formations.

H SERIES — For Hard Formations* Especially designed for use in harder formations, such as dolomite, hard limestone, traprock. Sturdy teeth, closely spaced on extremely strong cones, are capable of withstanding heaviest drilling weights. Gage tooth configurations are available with "L", "T" and full webb sections for hardest and most abrasive formations that can be cut with steel toothed bits. True rolling, non-offset cutters and extra large bearings assure longest life.

H SERIES INSERT TYPE — For Extremely Hard Formations* Tungsten carbide insert bits are available in three types for hardest, most abrasive formations such as granite, etc. An exclusive Security feature of this series is the special placement of compacts for full gage protection and maximum gage cutting. H8 series features large compacts spaced on raised cutter structures for maximum ventilation and best penetration rates. H10 type, designed for hardest formations possible to be drilled, employs closely spaced large compacts in a "hunting tooth" pattern to avoid tracking and to maintain full coverage of bottom hole. H10 features rugged spear points with spirally placed compacts. H9 series is mid-way in hardness range between H8 and H10. Security insert bits have conical shaped points on compacts insuring faster penetration rates.

Security SUPER-AIRE bits feature extra-large, self-cleaning screens, maximum capacity bearings, and air passages to bearings unrestricted by ball retainer plugs as in other bits.

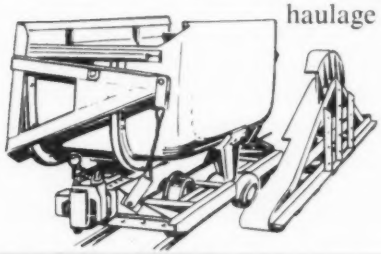
**Jet air or regular air types available. Send for catalog.*

Security®
ENGINEERING DIVISION
P. O. BOX 13647
DALLAS, TEXAS

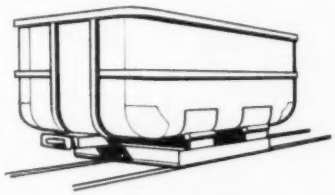
DRESSER INDUSTRIES, INC.

FOR YOUR PRODUCTION HAULAGE

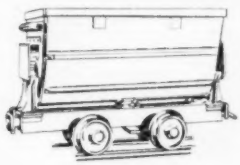
Our shops are known the world around for custom building of mine cars and other haulage equipment. Note this partial list of customers, many of whom have placed several repeat orders, indicating continuing satisfaction. Card can fit your needs economically. Our engineers are available for consultation on your haulage problem. No obligation.



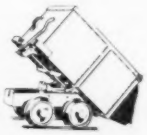
Granby Type Car & Dump Block



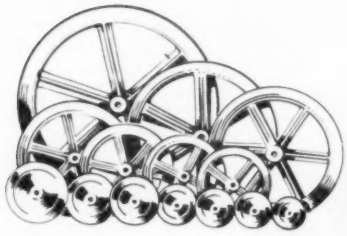
Telluride Type Car



Rocker Dump Car



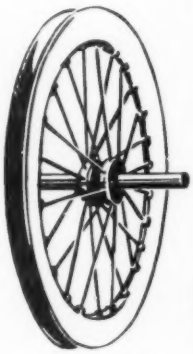
Type Z Car



Standard Heavy Pattern Rope Sheaves

Roller Bearing Track Rope Roller

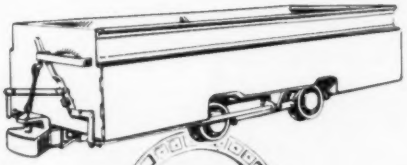
Card Curve Sheave

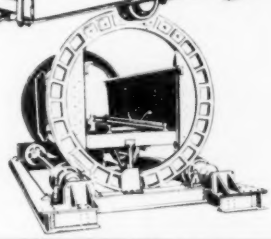


Bicycle Spoke Sheave

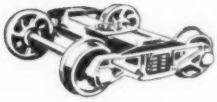
Card Timken Bearing Truck

All Steel Rotary Dump Car





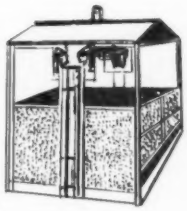
Power Driven Rotary Dump



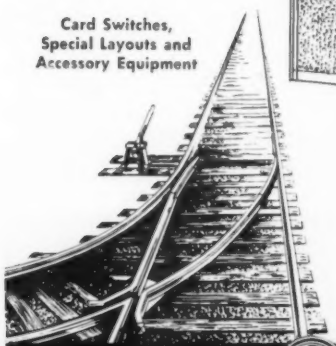
Spring Mounted Bolster Truck

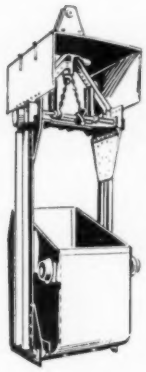
Card Automatic Skips

Card Cages

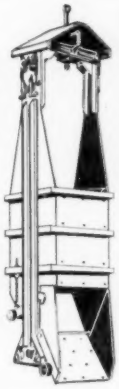


Card Switches, Special Layouts and Accessory Equipment





Kimberley Type



Bottom Dump

CLIMAX MOLYBDENUM
INTERNATIONAL MINERALS
PHELPS DODGE
KENNECOTT COPPER
UNION CARBIDE NUCLEAR
U. S. POTASH
MAGNA COPPER
PHILLIPS PETROLEUM
KERMAC NUCLEAR FUELS
HOMESTAKE
STANDARD URANIUM
IDARADO
CANANEA CONSOLIDATED COPPER
ANACONDA
VICTOR CHEMICAL WORKS
SUNSHINE MINING
POTASH CO. OF AMERICA
CONSOLIDATED MINING & SMELTING CO. OF CANADA
AMERICAN SMELTING & REFINING
U. S. SMELTING, REFINING & MINING
UNION PACIFIC COAL
GENEVA COAL
CF&I
INDEPENDENT COAL & COKE
COLORADO & UTAH COAL
TUNGSTEN MINING
NEW JERSEY ZINC

C.S. Card Iron Works Co.

2501 WEST 16th AVE
Box 117—Denver 1, Colorado

The DEISTER CONCENTRATOR COMPANY, Inc.

The Original Deister Company — Incorporated 1906

CONCENCO PRODUCTS ®

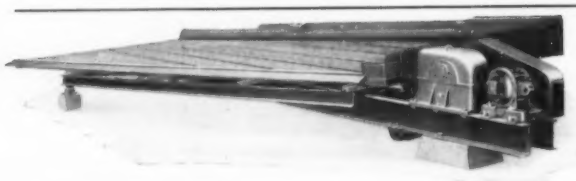
Manufacturers of Vibrating Screens, Ore Concentrating and Material Washing Tables

929 Glasgow Avenue, Fort Wayne, Ind.

® CONCENCO PRODUCTS

Export Sales ..... 60 Beaver St., New York 4, N. Y.
Pennsylvania Sales ..... 35 E. Center St., Nesquehoning, Pa.
Alabama Sales ... . 2612 North 24th St., Birmingham, Ala.
Drilling & Mining Equipment Co., 2020 Sacramento St., Los Angeles, Cal.

50 YEARS EXCLUSIVELY ENGAGED IN THE MANUFACTURE OF SEPARATING AND SIZING EQUIPMENT



SuperDuty

DIAGONAL-DECK Ore Tables

These DIAGONAL-DECK Concentrating Tables have been accepted as the standard the world over for more than a quarter of a century. Leading this line of outstanding and time proven tables is the *SuperDuty* DIAGONAL-DECK table, firmly established by substantial commercial applications as the most advanced in features, performance and practical advantages.

CONCENCO® DISTRIBUTORS

The CONCENCO Revolving Feed Distributor, built in six types, is a heavily fabricated, all steel machine with motor drive requiring only ¾ H.P. in operation. The Distributor effects perfectly a splitting of feed sluiced to its revolving tank, into any desired number of equal portions from two to sixteen, in some cases more. It is especially suitable for efficiently feeding any number of circuits or machines in battery for higher overall efficiency. It is unexcelled for feeding concentrating tables.

CONCENCO® CPC Classifiers

CONCENCO Constriction Plate Classifiers of all steel welded construction are furnished in any number of cells from 2 to 14 to meet requirements. Each cell is square in horizontal cross section and consists of three chambers: the pressure chamber at the bottom; the sorting column immediately above and separated from the pressure chamber by a constriction plate; and the launder section above the sorting column, which is materially increased in cross section to reduce velocity of flow.

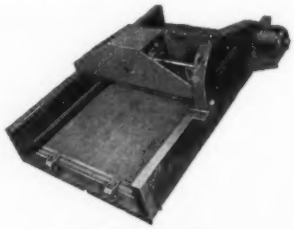
The CONCENCO SuperSorter (Giant Classifier) available in multiple cells, handles feed in excess of 100 tons per hour producing accurately sized products.

THE Leahy® SCREEN . . . *New Model E*

Now available with FlexElex® Heating of the Jacket

Due to their rugged construction and mechanical simplicity, Leahy Vibrating screens far outdistance other devices in overall equipment life.

The heavy duty vibrator, doubly dust-proofed type and enclosed, and forming an integral part of the structural steel bridge assembly, delivers a stronger and more positive vibration than ever before, superenergizing every square inch of screen jacket with the characteristic stratifying-screening - unblinding vibration, that is so highly acclaimed and profitably enjoyed by *Leahy* screen users. *Leahy* differential vibration guarantees open meshes, which in turn insure higher screening efficiency and capacity.



The Guaranteed Screen

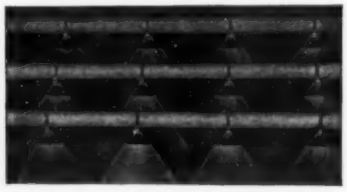
Uses—For wet or dry screening from 3″ opening down to fine mesh; also for dewatering and **heavy media** recovery. Unexcelled for screening at fine meshes.

Features—The new Model E Leahy Screen has simplicity combined with proved ruggedness. Installation is inexpensive, with supports figured for dead load only, because no vibration goes into the screen frame or supports, and only ½ H.P. is used to operate. The heavy duty vibrator, running-in-oil at 265 r.p.m., produces 1200 to 2000 v.p.m. as needed. Maintenance is negligible—averaging less than 1% of first cost annually. Screen jacket economy is reflected in costs as low as $0.000574 per ton treated. The quickest jacket change feature offered in screening equipment combines with the use of reasonably priced jackets of woven wire and, with some models, perforated plates.

Types and Sizes—Open type, totally enclosed dustproof type; single or double surface; belt drive or motor drive in sizes: 17x32 in.; 2x4 ft.; 3x5 ft.; 3x6 ft.; 3x7 ft.; 4x5 ft.; 4x6 ft.; 4x7 ft.; 4x8 ft.; 5x6 ft.; 5x7 ft.; 5x8 ft. Size designation indicates the overall dimensions of the screen jacket. *Special sizes built to order.*

CONCENCO Spray Nozzle — Water Sprays

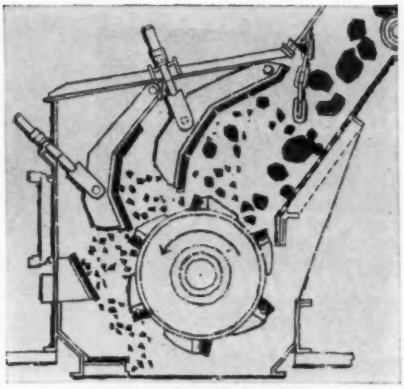
CONCENCO Spray Nozzles are unique and efficient. They are easy to apply. A hole is drilled in the pipe and the nozzle bolts on by means of a brass "U" bolt. No threading is necessary. The jet is a flat line spray very effective in washing or screening. The jets can be perfectly aligned one with another for sheet flow washing. The J-132 series with orifices of ⅛″ to ⅜″ fit 1″ to 2″ pipe. The J-136 series with orifices of 7/16″ to ¾″ fit 2″ to 4″ pipe.



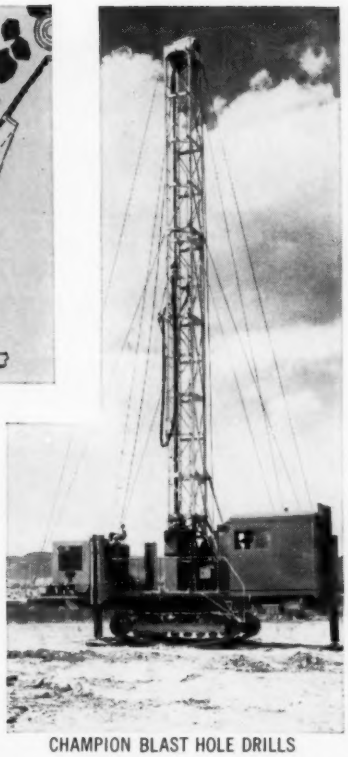
WRITE FOR CATALOGS

Patents on equipment owned or controlled by The Deister Concentrator Co., Inc. Trade-marks registered in U.S. and foreign countries.

SLUSHER IN MICHIGAN IRON MINE



HAZEMAG IMPACT CRUSHER

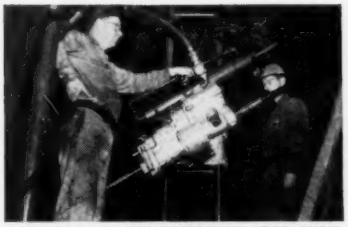


CHAMPION BLAST HOLE DRILLS

LOADER AND SHUTTLE CAR IN FRENCH IRON MINE

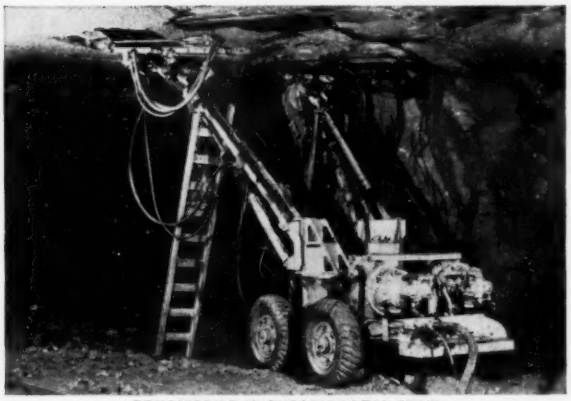
Speed Development... Increase Production

WITH MODERN JOY MINING EQUIPMENT



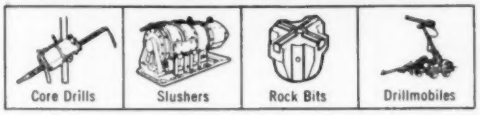
CORE DRILL IN PENNSYLVANIA IRON MINE

AIR LEG DRILLS IN CANADIAN URANIUM MINE



DRILLMOBILE IN MISSOURI LEAD MINE

EQUIPMENT FOR MINING... FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

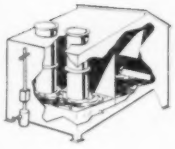
In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

For Mining and Smelting Operations...

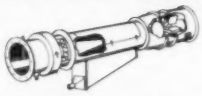
WESTERN
PRECIPITATION

Offers the Only Complete Line of AIR & GAS CLEANING EQUIPMENT

You get an unbiased recommendation - backed by over a half-century of industry leadership!



"TURBULAIRE-DOYLE" and "JOY MICRODYNE"
SCRUBBERS



▸ **"TURBULAIRE-DOYLE" SCRUBBERS** offer many important advantages where high efficiency, long life and maximum corrosion-resistance are essential in wet scrubbing types of applications. Unique *jet-action* scrubbing assures *unusually high collection efficiencies* without moving parts or frequent maintenance. **Write for detailed "Turbulaire-Doyle" literature!**

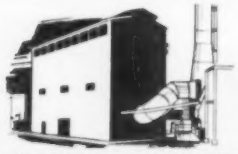
▸ **JOY MICRODYNE SCRUBBERS** combine unusual compactness, high operating efficiency and straight-thru "in-duct" design for new savings and economies on a wide range of applications. **For further details write for descriptive "Joy Microdyne" literature!**

"COTTRELL"
ELECTRICAL
PRECIPITATORS

▸ **WESTERN PRECIPITATION** is the organization that pioneered commercial application of the now-famous Cottrell process of *electrically* precipitating dust, fume, fly ash and other suspensions from gases. No other organization has had such extensive experience in this highly-technical field... no other offers such advanced developments and range of equipment... no other provides such unbiased recommendations on the type of installation best suited to *your particular* requirements. **For further data write for "Cottrell" literature!**

"MULTICLONE"
MECHANICAL
DUST COLLECTORS

▸ **THE "MULTICLONE"** pioneered the modern principle of multiple, small-tube, high-efficiency centrifugal collectors —and is still unequalled in the field. Not only does it offer the higher separating efficiencies obtained by the greater centrifugal forces developed in multiple *small*-diameter tubes, but the "Multiclone" also is easier to service and maintain... is simpler to install because it requires no costly, complicated ducting... is far more compact... and offers many other important advantages that save money and boost efficiency on mechanical dust collection applications. **For further data write for "Multiclone" literature!**

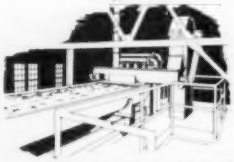


"THERM-O-FLEX"
HI-TEMPERATURE
FILTER
SYSTEMS

▸ **"THERM-O-FLEX" FILTER SYSTEMS** clean gases with inlet temperatures as hot as 600°F.—with virtually 100% collection. They use new type silicone-treated, woven glass filtering units that not only resist high temperatures but also are easily cleaned automatically by intermittent collapsing. No destructive vibration is required and there are no moving parts, nothing to require frequent service, maintenance or replacement. You save on both installation and operating costs. **For further data write for "Therm-O-Flex" literature!**

▸ **"DUALAIRE" REVERSE-JET FILTER SYSTEMS** are also available where high temperatures are not a factor. Continuous reverse-jet cleaning assures uniform operating efficiency. **Write for descriptive "Dualaire" literature!**

...and for modern Heat-Exchange operations

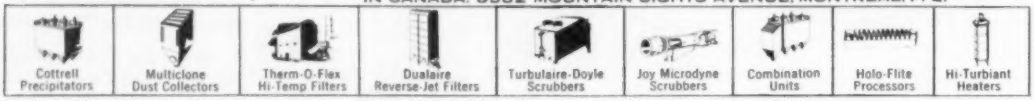


HOLO-FLITE
PROCESSORS

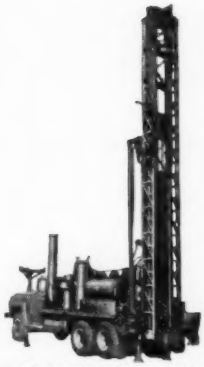
▸ **"HOLO-FLITE" PROCESSORS** circulate heating or cooling fluid through the hollow shaft and blades of a conveyor screw, thus processing granulars, fluids or sludges as they flow along in *continuous* bulk flow. Far faster and more efficient than batch processing. "Holo-Flite" heats and dries with Hot Oil to 600°F.... with Dowtherm to 750°F. ... with Steam to 150 PSI. Cooling range 1800°F. to 0°F. Multiple "Holo-Flite" tiers can be stacked for high capacities in minimum floor space. Many other cost-cutting advantages. **Write for descriptive "Holo-Flite" literature!**

WESTERN
PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY

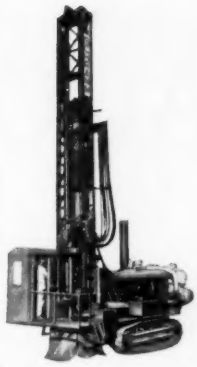
1000 WEST 9TH STREET, LOS ANGELES 54, CALIFORNIA
NEW YORK 17 • CHICAGO 2 • PITTSBURGH 2 • ATLANTA 5 • SAN FRANCISCO 4
IN CANADA: 8582 MOUNTAIN SIGHTS AVENUE, MONTREAL, P. Q.



Pneumatractor Mounted Rotadrill—125 cfm rotary drill rig. Hole sizes—up to 4½". Also 250 cfm model with hole sizes to 6".



Truck Mounted Rotadrill—400 cfm self-propelled rotary drill rig. Hole sizes up to 6½". Also 600 cfm model.



Crawler Mounted C66 Rotadrill—diesel or electric 600 cfm rotary drill rig. Hole sizes up to 8".

Here's a new standard of operating efficiency!

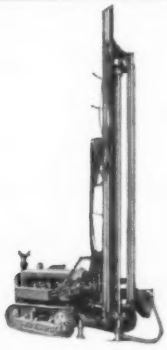
SCHRAMM CO-ORDINATED AIR POWER!

. . . lowers initial costs, manpower costs, maintenance costs!

Looking for a new way to lower operating costs? Then consider all of your air-powered equipment as a total operating area—rather than as isolated pieces—to find the wastes and inefficiencies that can be eliminated.

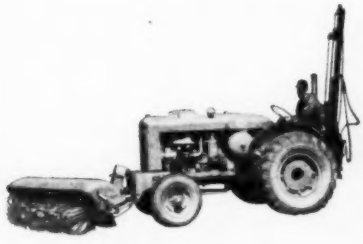
Then look at a Schramm Co-ordinated Air-Power Package, in which each unit complements the other. For example: mass production of corresponding parts used throughout the line means lower initial and replacement costs; also high interchangeability of wearing parts between engines and compressors, between products, between sizes. Savings multiply with each unit you add. But this is just part of the story. There are also big savings in manpower, time, other operating costs! For full information, return the coupon below!

Rotatool—fast-penetrating percussion tool increases drilling rates by producing maximum fracturing action at the bottom of the hole.

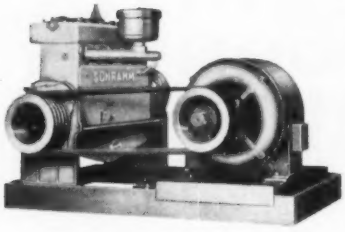


Crawler Mounted C42 Rotadrill—250 cfm rotary drill rig, holes to 6" with 22' mast travel.

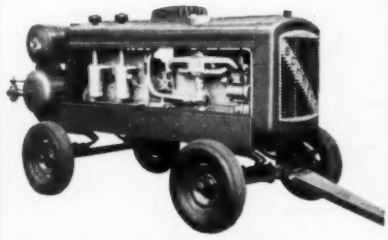
Truck-Mounted or Crawler-Mounted Do-it-yourself Kit—Complete Rotadrill package mounts on your own truck or tractor. Saves vehicle cost. Hole sizes to 6".



Self-propelled Compressors—Models 125 & 250 Pneumatractors—one man drives and operates. Wide range of accessories.



Stationary Compressors—electric motor or V-belt drive. Vibrationless operation—no foundation needed. 50 to 600 cfm.



Portable Compressors—Models from 20 cfm to 600 cfm. Economical, dependable, deliver full rated capacity at 100 psi.

Please send full data on:
Schramm Co-ordinated Air-Power Package, and . . .

- ☐ Truck Mounted Rotadrills
- ☐ Crawler Rotadrills
- ☐ Pneumatractor Rotadrills
- ☐ Do-it-yourself Rotadrills
- ☐ Rotatools
- ☐ Standard Pneumatractors
- ☐ Heavy Pneumatractors
- ☐ Portable Compressors
- ☐ Stationary Compressors
- ☐ Schramm Air Tools

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

SCHRAMM
CO-ORDINATED AIR POWER
675 GARFIELD AVENUE • WEST CHESTER, PENNA.

NACO ALLOY BALLS

through closer metallurgical control

tumble per-ton grinding *costs*

Through precise laboratory controls of the elements in steel making — from spectrographic analysis through final heat treating — Naco Grinding Balls possess the correct structure and hardness for maximum impact absorption and wearing qualities. Structurally, Naco Grinding Balls have a grain akin to tool steel — tough, hard and rugged. Laboratory tests show remarkable uniformity in solidity and controlled hardness holding to desired depth. Every day more mill operators are tumbling to the cost-saving advantages of Naco Grinding Balls.

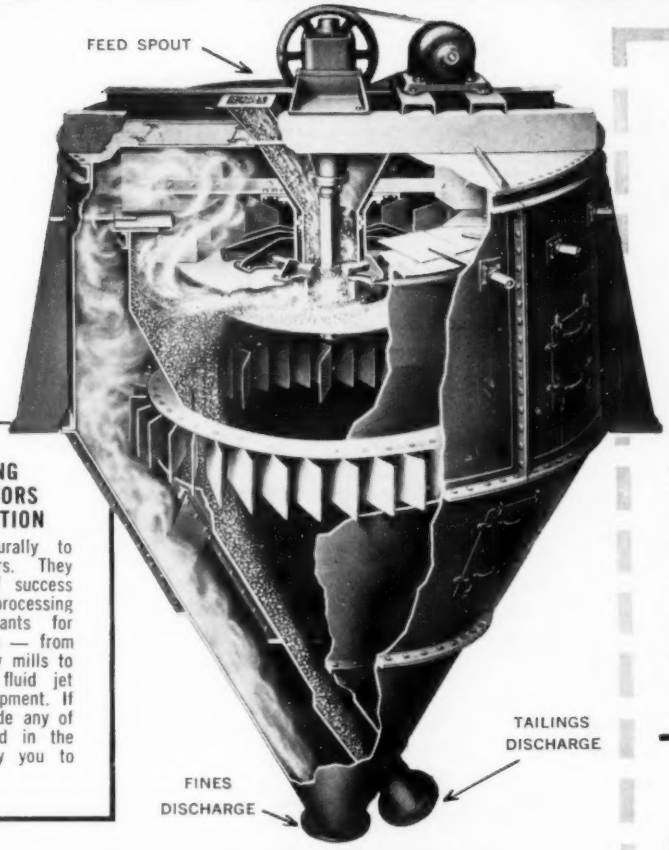
CAPITOL FOUNDRY DIVISION
POST OFFICE BOX 750
PHOENIX, ARIZONA

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

General Offices • Cleveland 6, Ohio

A-1668A

40 TO 400 MESH OUTPUT UPPED AS MUCH AS 300%



ENGINEERING AIR SEPARATORS TO SPECIFICATION

. . . comes naturally to Sturtevant engineers. They have a tradition of success in developing dry-processing equipment and plants for more than 75 years — from the first rock emery mills to the most modern fluid jet micron-grinding equipment. If your problems include any of the processes listed in the coupon, it will pay you to investigate.

WHAT CAN A STURTEVANT AIR SEPARATOR DO IN YOUR PULVERIZING SYSTEM?

In the cement industry, Sturtevant Air Separators have a tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% — when used in closed circuit with grinding mills. Maybe they can do as well for you.

Easily adaptable to your materials. Sizes of Sturtevant Air Separators range from 3 to 18 feet in diameter. They deliver fines from 40 to 400 mesh at rates as high as 100 tons per hour.

Designed to cut costs! Sturtevant Air Separators are built for a lifetime of low-downtime service. Rugged construction plus easy accessibility for quick maintenance (typified by the "OPEN-DOOR" design in other Sturtevant equipment) assures more output per machine-year. Check the coupon for more information.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are: _____

Desired capacity is: _____

Name _____ Title _____

Firm _____

Street _____

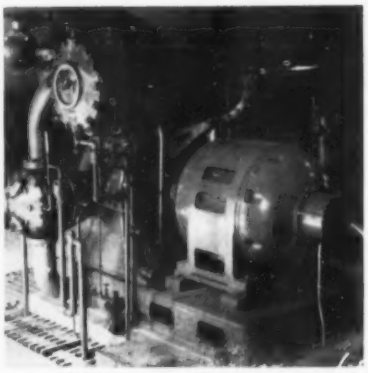
City _____ Zone _____ State _____

STURTEVANT MILL COMPANY, 157 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Air Separators ☐
Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE SELECTING ☐ GRANULATING ☐ CONVEYING

TYPICAL OF OUR OUTSTANDING INVENTORY VALUES



1528 cfm Joy Compressor

AGITATORS
2—4' x 5' Wemco, Wood Tank, 1½ HP
2—25' x 20' Steel Tank, 30 HP
1—S-3 "Lightnin", portable, 440 V

BLOWERS
1—12 x 20 Sutorbilt Rotary Positive Pressure
1—22" x 38½" Roots Rotary Positive, 150 HP. 2200 V
1—#6, Size 20" x 36" Roots Rotary Positive, 150 HP

CARS, MINE CAR
43—18½ cu. ft. Swivel end dump, 18 in. ga
13—100 cu. ft. Gable Bottom 18" ga
22—20 cu. ft. Coeur d'Alenes End Dump, 24" ga
7—31 cu. ft. C. S. Card Rocker Dump, 24" ga
4—93 cu. ft. C. S. Card Granby Type, 24" ga

CLASSIFIERS
1—Dorr-Oliver Type VRC Dorrclone, 3" dia
1—Size EE-10-4B Krebs Cyclone
1—4' x 15' Dorr Duplex Rake, DSFM, 3 HP
4—7' x 25½' Dorr Duplex Rake, DSFX, 10 HP
2—60" x 20' Akins Spiral, std. weir, 5 HP

COMPRESSORS
1—130 cfm. Gardner-Denver, Model AAD-1001, 20 HP
1—2500 cfm. Sullivan, Class WN4, 400 HP
2—1528 cfm. Joy Model WN114E, 300 HP. 2400 V
1—475 cfm. Joy WG-9, 12 x 9, 80 psi

CONCENTRATORS
1—8 Bank Humphrey Spiral, 5 turn, 24" dia
4—1 Bank Humphrey Spiral, 3 turn, 24" dia
4—1 Bank Humphrey Spiral, 5 turn, 30" dia
4—#14 Deister Diagonal Deck Tables, 1½ HP. Motors
8—#6 Deister Diagonal Deck Tables, with motors
1—#6 Wilfley Concentrating table, 1½ HP. motors
1—7' x 15 Deister Plato Concentrating table, 2 HP
2—#13A Wilfley Laboratory size tables, ¼ HP. motor

CONVEYORS
1—12" x 102' Rotary Cooling Screw Conveyor, 10 HP
2—Model BC-68 Carpco Sliding Belt, 6" x 33', ¾ HP
3—Model BC-68 Carpco Sliding Belt, 6" x 43', ¾ HP
1—30" x 48', Sectional Steel Frame, new belt
1—30" x 51', Steel Frame, 5 HP
4—36" x 50' Link Belt, Steel Frame, 7½ HP
1—36" x 645' Link Belt, Steel Frame, 2-100 HP. gearmotor, 440 V
1—42" x 870' Link Belt, trailing type with mobile stacker, 100 HP. gearmotor, 440 V
1—42" x 1250' Link Belt, Steel Frame, 2-100 HP gearmotor, 440 V
1—60" x 150' Belt Conveyor, Steel Frame, 100 HP gearmotor, 440 V
1—30" x 490' Jeffrey, 52H, steel frame, 15 HP
1—30" x 450' Jeffrey, 52H, steel frame, 15 HP
1—30" x 200' Jeffrey, 52H, steel frame, 15 HP
1—30" x 350' Jeffrey, 52H, steel frame, 15 HP

CRUSHERS, JAW
1—8" x 24" Union Iron Works, 30 HP
1—9" x 36" Cedar Rapids less motor
1—10" x 30" Pacific Type KH motor & drive
1—15" x 36" Universal, motor & drive
2—4' Symons std. Cone, fine bowl, 125 HP 440 V
1—4' Symons std. Cone, coarse bowl
1—15' x 24" Jaw Traylor Blake Type Jaw, 40 HP 440 V
1—30" x 42" Jaw Pioneer steel frame, RB. 125 HP excellent

CRUSHER, GYRATORY & CONE
1—2'4" Traylor Type TY

DREDGE
1—6 cu. ft. Yuba Electric Bucket Line, complete excellent
1—8 cu. ft. Bucyrus Erie, Bucket Line, diesel drive

FEEDERS, ORE
1—35" x 72" long Jeffrey Traylor Grizzly Pan, 440 V
1—Model GF-22-24 Syntron "Weigh Flow," 440 V, Exc
1—4' x 8' Jeffrey Vibrating Feeder, 440 V
1—36" x 15' Link Belt, Std. Pan, 3 HP
1—30" x 13' Sliding Belt, 1½ HP
8—8" x 36" Jeffrey Vibrating, 2 DH, 110 V
2—10" x 36" Jeffrey Vibrating, 2 AHD, 110 V
1—30" x 60" Syntron Vibrating, F45A, 440 V
1—30" x 48" Jeffrey Vibrating 4H, 440 V
1—24" x 72" Jeffrey Vibrating, 4H, 440 V
1—24" x 72" Jeffrey Vibrating 4, 440 V
1—30" x 60" Jeffrey Vibrating, 40D, 440 V
2—60" x 16'3" Pioneer-Oro, Apron, 20 HP 440 V

FILTERS
1—6' 2 disc. Eimco, with motor & drive
1—6' 3 disc. Eimco, with motor & drive
1—6' 5 disc. Oliver, with motor & drive
1—6' dia. 6 disc. Eimco, Vacuum pump, complete
1—4' 2 disc. Eimco, complete with drive

FLOTATION MACHINES
10—2 cell 56" x 56" Fagergren, steel tank, 10 HP
2—3 cell 56" x 56" Fagergren, steel tank, 10 HP
2—6 Cell No. 18 (28" x 28") Denver Sub A
1—6 cell No. 18 sp. (32" x 32") Denver Sub A
1—8 cell No. 18 sp. (32" x 32") Denver Sub A. steel tank, 10 HP motor
1—5 cell No. 18 sp. (32" x 32") Denver Sub A. steel tank, 7½ HP motor
1—1 cell No. 250 (32" x 32") Denver Unit cell, 5 HP motor
3—2 cell 48" x 48" Galigher Agitair, steel tank, 15 HP motor
1—4 cell, 16" x 16" Denver "Sub A"
1—1000 gm. Galigher Laboratory, glass Bowl

HOISTS, MINE SHAFT
1—600 HP Vulcan double drum mine shaft, 20,000 at 1500 fpm. complete with controls, dynamic braking 2300 V excellent
1—75 HP Puget Sound Single Drum, 440 V
1—165 HP Denver Engineering, 2 drum, 165 HP 440 V
1—100 HP Denver Eng. 1 drum, 100 HP 440 V
1—150 HP Vulcan-Denver, 1 drum, new
1—675 HP Vulcan Wilkes Barre, 2 drum, 2300 V

HOISTS, TUGGER & SLUSHER
1—FF311 Joy, 3 drum, 10 HP 440 V
3—10NNIG Ing. Rand, 2 drum, 10 HP 440 V
7—FF211 Joy, 2 drum, 10 HP 440 V
10—HB Gardner Denver, 1 drum. air, 1250#
8—L6-111 Joy, 1 drum, air, 2000#
10—HU Ing. Rand, 1 drum, air, 2000#
8—A5NNOH Ing. Rand, 2 drum, air

HYDRO SEPARATORS
1—36' x 10' Process Engineers, steel tank
2—24' x 8' Process Engineers, steel tanks

JIGS
1—26" x 26" Bendalari Simplex mineral jig
1—2 cell 42" x 42" Yuba Model 8
11—4 cell 42" x 42" Yuba, Model 8, 3 HP
1—1 cell 12" x 12" Pan American, PEI
1—6 cell 10" x 10" Pan American steel tank
1—12" x 18" Denver Duplex Mineral
1—16" x 24" Denver Duplex Mineral

KILN
1—48" x 30" Hardinge Rotary, XL2

LOCOMOTIVES
5—1½ Ton Mancha "Little Trammer" Battery, 18"-24" ga complete
1—1½ Ton Atlas Battery, 24" ga. Batteries
1—3½ Ton Mancha Titan AX Battery 18" ga
1—4 Ton Mancha Titan AX Battery 24" ga
1—7 Ton Plymouth Diesel, 18" ga Scrubber
1—4 Ton Mancha "Electric Mule", 24" ga
1—8 Ton Plymouth Diesel, DHD, 24" ga
1—6 Ton Mancha Std. AN, Battery, 24" ga

MAGNET
1—24" x 24" Magnetic Pulley 250 V DC
2—24" x 30" Dings Magnetic Ferma Pulley

MILL, BALL AND ROD
1—5 x 10 Marcy Ball Mill, 100 HP motor 440 V
5—8 x 9 Traylor Ball Mill, 250 HP Syn. Motor
1—5' x 8' Traylor Rod Mill, 150 HP 440 V
1—6' x 16" Hardinge Conical Ball Mill, 50 HP
1—7' x 48" Hardinge Conical, Large Trunnion, 150 HP
1—7' x 22" Hardinge Conical, Large Trunnion, 75 HP
1—7' x 36" Hardinge Conical, Large Trunnion, 100 HP
1—7' x 5' Allis Chalmers, grate type, 150 HP

MUCKING MACHINES
7—#12B Eimco Loaders, 18" ga
1—#21 Eimco Loaders, 18-24" ga
6—GD9H Gardner Denver Loaders, 18" ga
1—HL3 Sullivan loaders, 18" ga

PUMPS
1—14" Yuba Centrifugal, 5500 gpm. 250 HP
1—14" Yuba Centrifugal, 5500 gpm. 125 HP
1—10" Yuba Centrifugal, 2400 gpm. 75 HP
1—16" Wintroath deepwell, 2000 gpm. 100 HP
1—2GT Ing. Rand, 50 HP 440 V
2—1MRVN-7½ Ing. Rand, 7½ HP 440 V
1—1MRVH-15 Ing. Rand 15 HP 440 V
2—2MRV-25 Ing. Rand, 25 HP 440 V
2—5RUL-30 Ing. Rand. 30 HP 440 V RVL
2—16" Cascade Sump, 7440 gpm, 30 HP
1—2" Denver Equipment Co. Simplex Diaphragm
1—6" Fairbanks Morse, 300 HP Regutron Controls

PUMPS, DIAPHRAGM AND SAND
2—8" Dorrco Duplex Type W, 5 HP TEFC motor
3—6" Dorrco Duplex, Type VM, 3 Hp
2—6" x 6" Allis Chalmers Sand, NRLOR, 30 HP

PUMPS, VACUUM
2—18" x 6" Ingersoll Rand, ER-1, 15 HP 440 V
1—17" x 10" Chicago Pneumatic, NISB, 25 HP

SCREENS
1—9' dia. x 54'6" Yuba Trommel, 100 HP
3—4' x 12' Tyler Ty-Rock, 1 deck, F600, 10 HP
1—4' x 8 Symons Rod Deck, Type K, 7½ HP
1—3' x 6' Allis Chalmers "Aero-Vibe" 2 HP
1—4' x 10' Tyler "Hummer" Vibrating, complete
3—6' x 14' Hewitt Robins, MH-11, Scalping
2—6' x 12' Allis Chalmers Lowhead
1—4' x 8' Tyler Hummer

SEPARATOR, DRUM
1—30" x 75" Type WPD Stearns Magnetic Drum

SEPARATORS, MAGNETIC & HIGH TENSION
4—MI-418 Carpco Magnetic separator
1—HS-418 Carpco High Tension Separator
1—HS-218 Carpco High Tension Separator
4—HT-460 Carpco High Tension Separator
1—Memco-Hope Magnetic Separator, 16½' x 12" type CB

SHOVELS
1—Model 111M Marion Diesel electric, 4 yd. Shovel front
1—Model 170B Bucyrus Erie, electric 7 yd. 375 HP AC motor 2400/4160Y & Esco Bucket
1—20B Bucyrus Erie, w/dragline
1—54B Bucyrus Erie Dragline

THICKENERS
1—100' Dorrco Traction, 3 HP gearmotor
1—120' Dorrco Traction, type IC, 5 HP

TIMBER FRAMER
1—Stearns Roger Single End, 440 V excellent

TRUCK
1—15 Ton Mack off Highway, Model LRX

TRANSFORMERS
3—250 KVA G.E. 2400/4160Y-240/480 V 1 phase
3—833 KVA Westinghouse, 55000-2400 V 1 phase

WEIGHTOMETER
1—18" Merrick, Model E, w/rateograph

PARTIAL LISTING *SEND FOR OUR CATALOGS*

MACHINERY CENTER, INC.

1201 South 6th West, P.O. Box 964, HU 4-7601, Salt Lake City, Utah

INSPECT AND SELECT your equipment needs from our Denver stock — Thoroughly reconditioned in our complete shop facilities and backed by our 63 year old reputation for RELIABILITY, DEPENDABILITY, AND ECONOMY.

BALL AND ROD MILLS
1—3′ x 8′ Marcy Rod Mill
1—3′ x 9′ New Morse Rod Mill
1—54″ x 48″ Hirsch Ball Mill
1—5′ x 10′ Denver Ball Mill
1—64½ Marcy Ball Mill
1—8′ x 22″ Hardinge Pebble Mill
2—32″ x 36″ Miners Finishing Mills

JAW CRUSHERS
6—2½″ x 3¼″ New Morse Lab Crushers
4—4″ x 6″ New Morse Lab Crushers
2—5″ x 6″ New Morse Crushers
1—6½″ x 7″ Hendy Jaw Crusher
1—10″ x 20″ Pacific Jaw Crusher
1—20″ x 36″ Diamond Jaw Crusher

CLASSIFIERS
1—30″ x 14′ Akins Simplex Spiral Classifier
1—36″ x 20′6″ Dorr Duplex Rake Classifier
1—8′ Deco Hydro-Classifier

BATTERY LOCOMOTIVES
1—1 Ton General Electric
1—1½ Ton Mancha Trammer
1—4 Ton General Electric
1—4 Ton Westinghouse Baldwin
2—5 Ton General Electric
2—6 Ton General Electric
1—7 Ton Atlas
3—8 Ton Ironton
1—8 Ton Goodman
2—8 Ton General Electric
4—10 Ton Atlas

JIGS
1—8″ x 12″ Deco Duplex
1—24″ x 24″ Bendelari Simplex
2—42″ x 42″ Pan American Duplex
1—42″ x 42″ Bendelari Duplex

SAND PUMPS
1—1″ Wilfley Pump
2—2″ Wilfley Pumps
1—2″ Wilfley Slurry Pump
1—2″ Wemco Pump
1—2″ Denver Pump
1—2″ Galagher Vac-Seal Pump
1—3″ Wemco Pump
2—4″ Allen-Sherman Hoff Pumps
2—4″ Wilfley Pumps

LOADERS
3—Eimco 12 B Mucking Machines
1—Joy HL-20 Mucking Machine

FLOTATION MACHINES
1—1 Cell Denver 24″ x 24″
1—1 Cell Morse Jetair 22″ x 22″
1—1 Cell Fagergren, 27″ dia.
1—1 Cell Fagergren, 36″ x 36″
1—2 Cell Morse-Weinig, 37″ x 37″
1—2 Cell Fegergren, 66″ x 66″
1—4 Cell Denver 24″ x 24″
1—4 Cell Denver, 38″ x 44″
1—6 Cell Stearns-Roger, 31″ x 31″

CONCENTRATING TABLES
6—Deister-Overstrom Diagonal Deck
6—Dunham "Economy" tables

VIBRATING SCREENS
1—18″ x 56″ Traylor Electric "Conveyanscreen"
1—42″ x 72″ Jeffrey Electric Screen, Type FB-2
2—4′ x 6′ Allis-Chalmers "Aero-Vibe" single deck screens
1—3′ x 7′ Robbins "Gyrex" single deck screen
1—4′ x 8′ Robbins "Gyrex" double deck screen
1—4′ x 12′ Diamond double deck screen

AIR SLUSHER HOISTS
1—Joy Model S-211
1—Gardner-Denver Model HEE
1—Gardner-Denver Model HKE
1—Ingersoll-Rand Model HNN1J
1—Sullivan Model F-212
1—Sullivan Model F-211

AIR TUGGER HOISTS
1—Gardner-Denver Model HBA
2—Ingersoll-Rand Model EUA
1—Ingersoll-Rand Model DU
4—Ingersoll-Rand Model 10H
4—Ingersoll-Rand Model 14
1—Sullivan Model HA3
1—Sullivan Model L-111
13—Sullivan Model E-111
3—Joy Model F-113
4—Gardner-Denver Model HK

ELECTRIC TUGGERS & SLUSHERS
2—7½ HP Sullivan Tuggers Model HE
3—7½ HP Sullivan Slushers Model HDE-7-D212
1—15 HP Ingersoll-Rand Slusher Model 15 NN-1G
1—10 HP Sullivan 3 drum slusher model A-312
1—60 HP Sullivan 3 drum slusher, model CF-312

MINE FANS AND BLOWERS
1—1½ HP La-LDel Axial Vane
1—1½ HP Jeffrey "Midget" Blower
1—15 HP Coppus Blower, TM 8
1—8H—42″ Jeffrey Blower
1—10′ Joy-LaDel Mine Fan

AINLAY BOWLS
3—36″ Ainlay Duplex Bowls, Centrifugal gold separators

THIS IS BUT A PORTION OF OUR LARGE INVENTORY
CONSULT US ON ALL YOUR MACHINERY AND ELECTRICAL EQUIPMENT REQUIREMENTS

MORSE BROS. MACHINERY COMPANY

2900 Brighton Blvd. **Denver 1, Colorado** **KEystone 4-5261**

TUNNEL EQUIPMENT

1—EIMCO Model 40 Mucker and Belt Loader, 24″ Gage
2—EIMCO Model 21B Mucker, 24″ Gage
2—8 Ton, 24″ Gage Plymouth Diesel Loco.
1—3½ Ton, 24″ Gage Ruston Hornsby Loco.
1—Rex Pumpcrete Model 200S, Pump & Pugmill Trailer Mounted, 130 HP Electric Drives
1—100 HP International Axial Fan
2—75 HP Joy Series 1000 Axivane Fans
1—50 HP General Blower Co. Axial Fan
1—900 C.F.M. G.D. Rotary Compressor, Portable G.M.C. 6-110 Diesel
1—600 C.F.M. G.D. Rotary Compressor, Portable G.M.C. 671 Diesel
30—3 Yard & 4 Yard Cars
All Electric Drives are 440 V., 3 Ph., 60 C. Air Equipment is 100 P.S.I.

PACIFIC AMERICAN COMMERCIAL CO.
2911 E. Marginal Way, Seattle, Wash.

Use the
MINING WORLD yearbook
the year 'round for your mining and purchasing requirements.

Complete Line Of
DREDGES and DREDGING EQUIPMENT FOR MINING

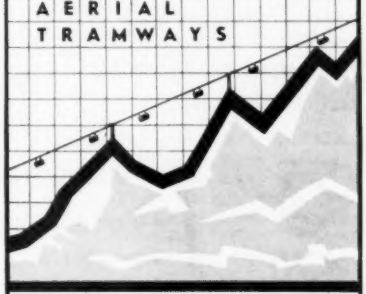
- *Hydraulic*
- *Bucket Line (Placer)*
- *Dipper*
- *Grapple*

Plus detailed engineering service . . . write for full information.

ELLICOTT MACHINE CORPORATION
1627 Bush Street, Baltimore 30, Md.
525 Market Street, San Francisco 5, Calif.

ELLICOTT MACHINE CORPORATION, Baltimore 30, Maryland, U.S.A.; Ellicott-Brandt, Inc., Baltimore, Maryland; Ellicott Fabricators, Inc., Baltimore, Md.; McConway & Torley Corp., Pittsburgh, Pa.; Timberland-Ellicott, Limited, Woodstock, Ontario, Canada; Dragues Ellicott France, Paris, France; Dragas Ellicott do Brasil Ltda., Rio de Janeiro, Brazil; Ellicott de Mexico, Mexico City, Mexico.
Successors to the floating dredge business of the Bucyrus-Erie Company and the American Steel Dredge Co. Complete engineering, design and construction service.
1146

RIBLET



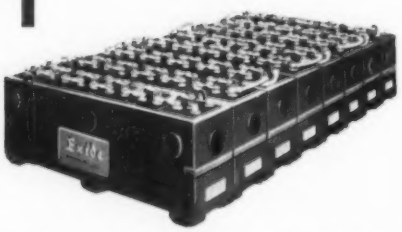
LIFTS PROFITS . . . LOWERS TRANSPORTATION COSTS

Custom Riblet Aerial Tramways can conquer your climatic or topographical transportation obstacle. Write for your no-obligation, descriptive brochure . . . learn how this unique transportation method can reduce operation costs for your company.

RIBLET TRAMWAY COMPANY BOX 7, STATION A, SPOKANE, WASH.

EXIDE POWER PACKAGE— THE BIG, NEW ECONOMIZER

1

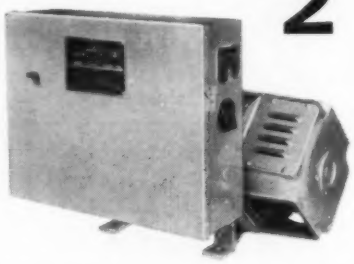


Low-cost battery power

For any mine locomotive, there is one particular type and size battery that best meets your requirements. And only Exide offers so broad a range of types and sizes. Let your Exide man recommend the one battery that's best for you. The Exide line includes Exide-Ironclad, with new higher capacity and longer life potential; Exide-Powerclad, premium quality flat plate battery; and Exide nickel-iron-alkaline, invented by Thomas A. Edison.

High-efficiency chargers

2



Install high-efficiency Exide chargers with your batteries and save money on your power. Buy your chargers as part of an Exide power package. Your Exide man will recommend the size and type charger that fits your needs exactly. So you get complete charging and don't pay for unneeded capacity. Correct charging rate helps prolong the life of your batteries. Choice of either rotating or rectifier type chargers.

3

Fast, dependable service

The complete Exide power package is the lowest-cost way of getting the maximum for your battery dollar investment. Exide service men, factory-trained specialists in Exide equipment, will help you attain lowest cost through long service life. Over 200 specialists located from coast to coast available to give you prompt service when you need it.

For complete information on the economies of the Exide power package, write Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa.

Exide®

INDUSTRIAL MARKETING DIVISION
The Electric Storage Battery Company
ESB

W. R. WADE

Consulting Mining Engineer

Another **WADE**
Designed and Built

GOLDMILL

Operating data at this mill

Gold Recovery 97%
Silver Recovery 92%
¾ of Gold as Bullion
¼ of gold in $1000. per ton concentrates
MILLING COSTS $1.15 per ton

W. R. WADE
MARYSVILLE, MONTANA
Cable WADE HELENA
Telephone Helena Hickory 2-0105

CORE DRILLS, BLAST HOLE DRILLS, Auger Drills, Hand Drills, Well Drills, one-man gold dredges. New and used equipment at money saving prices. Everything in supplies. Send for bulletins. **Pressey & Son,** Pueblo, Colorado.

FOR SALE

MARCY BALL MILL, Six Foot, Size 65, R.H. Overflow, Manganese liners, Feeder Box, with 150 HP, Slip ring motor and controls.
Note: This mill has only had 600 hrs. use. Like new but priced at one half of new price.
Price: $11,000.00 Tacoma, Wash.

George Katica, Owner
3376 Lincoln Ave. Tacoma, Wash.

PROFESSIONAL DIRECTORY

One-Inch Card, $90 Yearly—½-Inch, $60 Yearly, Payable in Advance.

CONSULTING ENGINEERS

BURBRIDGE—PYBURN
Consulting Engineers & Geologists
Mining—Petroleum
Southwestern U. S. & Latin America
Mills Bldg., El Paso, Texas—Tel. KE 3-4741

CHAPMAN, WOOD AND GRISWOLD
Mining Engineers & Geologists
P.O. Box 8302 — Albuquerque, N. M.
525 Vernon Drive — Vancouver 6, B. C.
Cable: CHAPWOLD

COWIN & CO., INC.
Mining Engineers and Contractors • Consulting Appraisal Repots • Shaft & Slope Sinking • Mine Development • Mine Plant Construction.
1-18th Street, S. W. Birmingham, Ala.
Phone ST 6-5566

KELLOGG EXPLORATION COMPANY
GEOLOGISTS—GEOPHYSICISTS
Magnetic — Seismic
Electromagnetic — Radioactivity
3301 North Marengo Avenue
Altadena, California — Sycamore 4-1973

LOTTRIDGE-THOMAS & ASSOCIATES
Professional Engineers
705 Judge Building
SALT LAKE CITY 11, UTAH

MERRILL W. MacAFEE
CONSULTING ENGINEER
CHEMICAL-METALLURGICAL-MINING
LUdlow 3-1778 — 7668 Santa Fe Ave.
FRontier 5-6145 — Huntington Park, Calif.

O'DONNELL & SCHMIDT
Mining Consultants
165 Broadway — Tel. BArclay 7-6960
New York 6. N. Y. — Cables: EXAMIMINES

STILL & STILL
Consulting Mining Engineers and Geologists
Room 24 Union Block — Prescott, Arizona

L. KENNETH WILSON
Consulting Geologist
400 Montgomery Street
San Francisco 4, Calif. — EXbrook 2-4313

WOLFE & ASSOCIATES
Geologists
Exploration-Valuation-Mineralogy
6518 Ledbetter St. — Houston 17, Texas
Tel OLive 4-1322 — Cables: WOLMAC

WISSER AND COX
GEOLOGISTS—ENGINEERS
investigations and consultation
RESOURCES—EXPLORATION—OPERATIONS
VALUATIONS—INVESTMENTS—UTILIZATION
55 New Montgomery St., San Francisco, California
YUkon 2-1436 — cables: GEOLOG

CHEMISTS, SAMPLERS, SHIPPERS' REP'S

ARIZONA TESTING LABS
Chemists—Spectroscopists—Assayers
Box 1888 — 817 W. Madison
Phoenix 1, Arizona

BOULDER SCIENTIFIC CO.
Beryllium Assaying by Gamma-Neutron Reaction
Quantitative $6.00 — Qualitative $1.00
250 Pearl St. — Boulder, Colo.

THE COLORADO ASSAYING CO.
ASSAYERS, CHEMISTS and SPECTROGRAPHERS
Est. 1900
Gold and Silver $2.50, Copper $1.50, Uranium $7.50. Send for free copy of our Mineralogist Pocket Reference Giving Detailed Information on all Principal Ores.
2244 BROADWAY—ALSO P.O. BOX 298
DENVER 1, COLORADO

ASSAYS. Complete, accurate, guaranteed. Spectrographic. Over 55 elements including rare earths and radioactives. $8. REED ENGINEERING. 620-Y So. Inglewood Ave., Inglewood 3, Calif.

Wood Assaying Co., Henry E.
Established 1878
ASSAYERS and CHEMISTS
733 W. Colfax — Denver 4, Colorado

DRILLING COMPANIES

DIAMOND DRILL
Contracting Company
S. 18 Stone, Spokane 31, Wash.
- "SUPER PIONEER" hand portable core drills
- "K & S INTERNATIONAL" standard surface drills
- "DIA-HARD" Core Barrels
- And a complete line of "Super Pioneer" and standard diamond drilling accessories.

R. S. MC CLINTOCK CO.
Diamond Core Drilling
Diamond Core Bits & Accessories
Spokane, Wash. — Globe, Arizona

WINK CORPORATION
Over 25 Years Experience in North and South America
Diamond Drilling Contractors and Consultants
Minerals, Dams, and Masonry
F. W. Wink, Pres. — Gordon Corlstine, VP
133 So. Linden Ave. So. San Francisco, Calif.
JUno 3-9150 — POplar 1-1941

WORLDWIDE PROFESSIONAL DIRECTORY

COOKE, EVERETT & ASSOCIATES, INC.
Geologists Engineers Geochemists
MINING — PETROLEUM — GROUND WATER
Resources — Exploration — Valuation
Investments — Research — Photogeology
Geophysics — Engineering — Geology
421 Court St. — P.O. Box 2229
Reno, Nevada — Cable: COVER
OFFICES: Calif.-N.M.-N.Y.-Ore.-Wash., D.C.
Argentina - Canada - India - Peru

ABBOT A. HANKS, INC.
ESTABLISHED 1866
ASSAYERS—CHEMISTS—ENGINEERS
Supervision of Sampling at Smelters and Shipping Points
Control and Umpire Assays
SPECTROGRAPHIC ANALYSIS
Inspection and Tests of Structural Materials
1300 Sansome Street — SAN FRANCISCO 11
Telephone EX 7-2464 — Cable Address: HANX

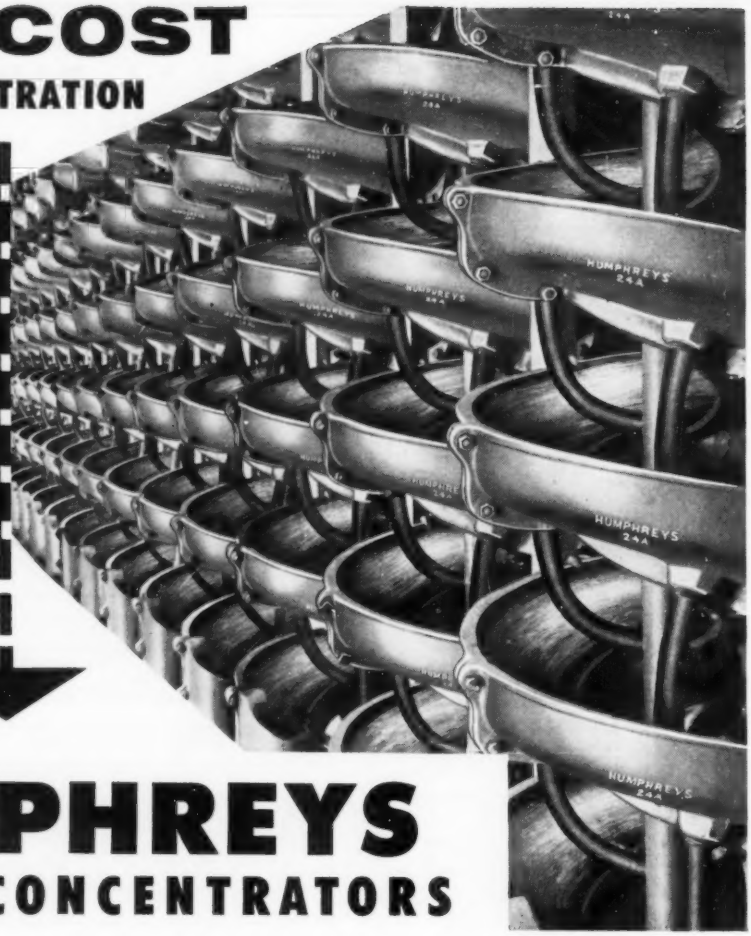
Longyear
Consultants to the mineral industry
EVALUATION—EXPLORATION
Development
Mine Layout—Management
Photo Interpretation
Negotiations—Lease Counsel
Market Surveys
Mineral Venture Management
76 So. 8th St. — 70 Pine St.
Minneapolis 2, Minn. — New York, N.Y.
Tel: FE 9-7631 — Tel: WH 4-8865
Cable: LONGCO
LONGYEAR N.V.
Zeekant 35, The Hague, Holland
For Information, write Dept. M.
E. J. LONGYEAR COMPANY
ADV 176A

R. L. LOOFBOUROW Min. Engr.
Site Testing — Plans — Estimates
Underground Construction — Mining
Mine Water Problems
4032 Queen Ave., So. Minneapolis 10, Minn.

GEORGE H. NEWMAN
Consulting Geologist
Registered Mining Engineer
Specialist in the Philippines
P.O. Box 2418 — Manila, Philippines

LOW COST
CONCENTRATION

ANTHRACITE COAL
BARITE
CASSITERITE
CHROMITE
COLUMBITE
HEMATITE
ILMENITE
LEPIDOLITE
MAGNETITE
MARTITE
MONAZITE
MUSCOVITE
NATIVE COPPER
PHOSPHATE
PITCHBLENDE
PYRITE
RUTILE
SCHEELITE
TANTALITE
URANINITE
VERMICULITE
WOLFRAMITE
ZIRCON



HUMPHREYS
SPIRAL CONCENTRATORS

Economically recover the minerals listed above

Low cost concentration is a reality with Humphreys Spirals. Economy minded mineral producers value the low installation and maintenance costs and trouble-free operation of these efficient concentrators. They occupy small floor space, have no moving parts.

APPLICATIONS:

Production of finished concentrate and tailing.
Production of bulk concentrate of several minerals and finished tailing.
Scavenging of tailing from another process for the recovery of heavy minerals otherwise lost.

Specialized engineering consultation and metallurgical evaluation are part of our services, write for information.

HUMPHREYS ENGINEERING COMPANY
910 American National Bank Bldg., Denver 2, Colorado

SALES AND MANUFACTURING AGENTS

AUSTRALIA:
JOHN CARRUTHERS & CO. PTY. LTD.
EDGECLIFF, N.S.W.

SOUTH AFRICA:
EDWARD L. BATEMAN LTD.
JOHANNESBURG

SWEDEN:
SALA MASKINFABRIKS A-B,
SALA

SALES AGENT—ENGLAND: THE GENERAL ELECTRIC CO., LTD. (FRASER & CHALMERS ENGINEERING WORKS) ERITH, KENT

MINING WORLD

1961 ORE BUYERS' GUIDE

Possible markets for: **Ores, Metals, Non-Metallics** *as compiled from lists furnished by the Division of Minerals, United States Bureau of Mines, and ore and metal buyers*

ANTIMONY

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Associated Metals & Minerals, 75 West St., New York 6, N. Y.
Churquini Enterprises, 67 Wall Street, New York 5, N. Y.
Derby & Co., Inc., 10 Cedar St., New York 5, N. Y.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Harshaw Chemical Co., 1945 E. 97th Street, Cleveland 6, Ohio
Intercontinental Metal Corp., 424 Madison Ave., New York 17, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
McGean Chemical Co., 1040 Midland Building, Cleveland 15, Ohio
Metal & Thermit Corp., 100 Park Ave., New York 17, N. Y.
Metal Traders, Inc., 26 Broadway, New York 4, N. Y.
Metro Smelting Co., Ontario & Bath Sts., Philadelphia 34, Pa.
Miles Metal Corp., 150 Broadway, New York 38, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine Street, New York 5, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
South American Mineral & Merchandising Corp., 425 Park Ave., New York 22, N. Y.
Southern Lead Co., 2800 W. Moreland St., Dallas, Tex.
C. Tennant, Sons & Co., 100 Park Avenue, New York 17, N. Y.
Nathan Trotter & Co., 36 North Front Street, Philadelphia 6, Pa.
Wah Chang Corporation, 233 Broadway, New York 7, N. Y.
Watson Geach & Co., Inc., 25 Broadway, New York 4, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

ASBESTOS

American Asbestos Textile Corp., Strawbridge & Sterigere Sts., Norristown, Pa.
Armstrong Cork Co., 1010 Concord St., Lancaster, Pa.
Carolina Asbestos Co., Davidson, North Carolina
Ehert Magnesia Mfg. Co., Valley Forge, Pennsylvania
Flintkote Co., 4111 R.C.A. Bldg., New York 20, N. Y.
Garlock Packing Co., 250 Main Street, Palmyra, New York
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Johns Manville Sales Corp. 22 E. 40 Street, New York 16, New York
Keasbey & Mattison Co., Ambler, Pennsylvania
Mundet Cork Corp., 7203 Tonnelle Ave., North Bergen, N. J.
Pabco Products, Inc., 1550 Powell Street, Emeryville, California
The Philip Carey Mfg. Co., 1935 Easton Blvd., Lockland, Cincinnati 15, Ohio
Raybestos-Manhattan, Inc., Passaic, N. J.
The Ruberoid Co., South Bound Brook, New Jersey
Union Asbestos & Rubber Co., 332 South Michigan Ave., Chicago 4, Ill.
U. S. Rubber Co., 1232 Ave. of the Americas, New York, New York
Victor Mfg. & Gasket Co., 5752 W. Roosevelt Rd., Chicago 50, Ill.

BARITE

(Possible buyers of crude barite)

Baroid Sales Division, National Lead Co., P. O. Box 1675, Houston 1, Texas
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
The Glidden Co., Chemical & Pigment Division, 766 50th Ave., Oakland 1, Calif.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Industrial Minerals & Chemical Co., Sixth and Gilman St., Berkeley, Calif.
Macco Corp., 14409 S. Paramount Blvd., Paramount, Calif.
Magnet Cove Barium Corp., P. O. Box 6504, Houston 5, Texas
Milwhite Mud Sales Co., Box 15038, Houston 20, Texas
Ozark Smelting and Mining Co., Coffeyville, Kans.
Super Bar Co., Mineral Point, Mo.
Westvaco Min. Prod. Div., Food Machinery & Chemical Corp., P. O. Box 920, Modesto, Calif.
C. K. Williams & Co., 2001 Lynch Ave., East St. Louis, Ill.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

(Possible buyers of crushed or ground barite for use in glass)

Anchor-Hocking Glass Co., 109 N. Broad St., Lancaster, Ohio
Ball Bros., Ryan and Burt Sts., Muncie, Ind.
Brockway Glass Co., Brockway, Pa.
Buck Glass Co., Fort and Silica Sts., Baltimore, Md.
Commercial Glass Co., Fairmont, W. Va.
Diamond Glass Co., Royersford, Pa.
Foster-Forbes Glass Co., Marion, Ind.
Hazel-Atlas Glass Co., 1942 Danneburg St., Wheeling, W. Va.
Latchford-Marble Glass Co., P. O. Box 4707, Los Angeles, Calif.
Owens-Illinois Glass Co., Duraglas Bldg., Toledo, Ohio
Owens-Illinois Pacific Coast Co., 135 Stockton St., San Francisco, Calif.
Sterling Glass Co., Dapel, Ind.
Thatcher Manufacturing Co., Elmira, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

(Possible buyers of ground barite for use in paint)

Amalgamated Paint Co., Inc., Pier 11, North River, New York, N. Y.
Armstrong Cork Co., 1010 Concord St., Lancaster, Pa.
Atlantic Paint & Varnish Works, Wilmington, N. C.
Baker Paint & Varnish Co., 224 Suydam Ave., Jersey City, N. J.
C. E. Bulter Co., 2868 Hanna St., Oakland 8, Calif.
Fisher Thorsen & Co., Inc., 2100 N. W. 22nd Ave., Portland 10, Ore.
W. P. Fuller & Co., 301 Mission St., San Francisco, Calif.
General Paint Corp., 2627 Army St., San Francisco 19, Calif.
U. S. Gypsum Co., 300 W. Adams St., Chicago, Ill.
Wesco Waterpaints, Fifth and Grayson Sts., Berkeley 2, Calif.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

BENTONITE

(Possible buyers of crude and ground)

Abbott Laboratories, North Chicago, Ill.
American Colloid Co., Merchandise Mart Plaza, Chicago 54, Ill.
Atlantic Refining Co., 260 S. Broad St., Philadelphia, Pa.
Baroid Sales Div., National Lead Co., P. O. Box 1675, Houston 1, Texas
Cities Service Refining Co., Boston, Mass.
Commercial Minerals Co., San Francisco, Calif.
Charles B. Crystal Co., Inc., 53 Park Place, New York, N. Y.
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
Eastern Clay Products, Inc., 223½ Main St., Jackson, Ohio
Filtrol Corp., 634 S. Spring St., Los Angeles 14, Calif.
Great Lakes Foundry Sand Co., 700 United Artists Bldg., Detroit, Mich.
Gulf Refining Co., 260 S. Broad St., Philadelphia, Pa.
Hammil & Gillespie, Inc., 225 Broadway, New York 7, N. Y.
Harshaw Chemical Co., 47 Ann St., New York 7, N. Y.
Pure Oil Co., 35 E. Wacker Dr., Chicago, Ill.
Quaker State Oil Corp., Emlenton, Pa.

BERYLLIUM

The Beryllium Corp., P. O. Box 1462, Reading, Pa.
Beryl Ores Co., Arvada, Colo.
The Brush Beryllium Co., 4301 Perkins Ave., Cleveland 3, Ohio
Champion Spark Plug Co., Toledo 1, Ohio
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
Lapp Insulator Co., Inc., LeRoy, N. Y.
H. K. Porter Co., Lisbon, Ohio
A. O. Smith Corp., 3533 N. 27th St., Milwaukee 16, Wisc.
Note: Domestic beryl is also purchased at Government buying depots at Custer, S. Dak., Franklin, N. H., and Spruce Pine, N. C.

BISMUTH

(Metal)

American Metal Climax Inc., 61 Broadway, New York 6, N. Y.
American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
The Anaconda Co., 25 Broadway, New York 4, N. Y.
Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
J. T. Baker Chemical Co., Phillipsburg, N. J.
Campagnie Aramaya de Minas en Bolivia, 120 Broadway, New York 4, N. Y.
Cerro de Pasco Corp., 300 Park Ave., New York 22, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
Mallinckrodt Chemical Works, 2nd & Mallinckrodt Streets, St. Louis 7, Mo.
Merck & Co. Inc., Rahway, N. J.
Miles Metal Corp., 150 Broadway, New York 38, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Norwich Pharmacal Co., 17 Eaton Avenue, Norwich, N. Y.
Charles Pfizer & Co., Inc., 11 Bartlett Street, Brooklyn 6, N. Y.
U. S. Metals Refining Co., 61 Broadway, New York 6, N. Y.
U. S. Smelting Refining & Mining Co., 75 Federal St., Boston 6, Mass.

CADMIUM

American Metal Climax Inc., 1270 Avenue of the Americas, N. Y. 20, N. Y.
American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
American Zinc, Lead and Smelting Co., 1600 Paul Brown Bldg., St. Louis, Mo.
The Anaconda Co., 25 Broadway, New York, N. Y.
Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
The Bunker Hill Co., P. O. Box 29, Kellogg, Idaho
Chemical and Pigment Co. (Div. of the Glidden Co.), Baltimore 22, Maryland
Eagle Picher Co., (Mining and Smelting Div.), P. O. Box 910, Miami, Okla.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Intercontinental Metal Corp., 424 Madison Ave., New York 17, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
International Minerals and Metals Corp., 11 Broadway, New York 4, N. Y.
International Smelting and Refining Co., 818 Kearns Bldg., Salt Lake City, Utah
Miles Metal Corp., 150 Broadway, New York 38, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
New Jersey Zinc Co., 160 Front St., New York 38, N. Y.
Sherwin-Williams Co., Ozark Smelting & Mining Div., 101 Prospect Av., N.W., Cleveland 1, Ohio
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.

J. E. DE SOUSA
CO., INCORPORATED

100 Church Street, New York 7, N.Y.

•

Mine Owners
International Ore Merchants
Selling Agents for Mining Companies

•

SPECIALISTS IN ORES OF

BERYLLIUM • BISMUTH • COLUMBIUM
LITHIUM • RARE EARTHS • TANTALUM
THORIUM

other minor and rare ores

MAGMA
COPPER COMPANY

Buyers of

COPPER, GOLD

AND SILVER ORES

MINES AND SMELTER AT

SUPERIOR, ARIZONA

CHROME ORE

(Metallurgical ore users)

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
Baltimore Works, Armco Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
Leonard J. Buck, Inc., One Exchange Place, Jersey City 3, N. J.
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
Keokuk Electro-Metals Co., Div. of Vanadium Corp. of America, Keokuk, Iowa
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Montana Ferroalloys, Inc., P. O. Box 1400, Memphis, Tenn.
Ohio Ferro-Alloys Corp., 839 30th St. N.W., Canton 9, Ohio
Pacific Northwest Alloys, Inc., P. O. Box 6247, Hillyard Station, Spokane, Wash.
Pittsburgh Metallurgical Co., Niagara Falls, N. Y.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
Tennessee Products & Chemical Corp., 2611 West End Ave., Nashville 5, Tenn.
Union Carbide Metals Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corporation of America, 420 Lexington Ave., New York 17, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

(Chemical ore users)

Leonard J. Buck, Inc., One Exchange Place, Jersey City 3, N. J.
Columbia-Southern Chemical Corp., 902 Garfield Ave., Jersey City 5, N. J.
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio
Diamond Alkali Co.-Kearny Plant, Belleville Turnpike, Kearny, N. J.
Foote Mineral Co., Inc., 10 E. Chelten Ave., Philadelphia 44, Pa.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Imperial Color Chemical and Paper Corp., Dept. of Hercules Powder Co., Glens Falls, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Mutual Chemical Div., Allied Chemical Corp., 99 Park Ave., New York 16, N. Y.
Frank Samuel & Co., Inc., 2 Penn Center Plaza, Philadelpiha 2, Pa.
Solvay Process Div., Allied Chemical Corp., P. O. Box 271, Syracuse, N. Y.

(Refractory ore users)

Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, Ohio
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
E. A. Godoy & Co., Inc. 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
International Bartering Co., 52 Broadway, New York 4, N. Y.
Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.

COBALT

Allied Chemical & Dye Corp., General Chemical Div., Marcus Hook, Pa.
Baker Chemical Co., J. T., Phillipsburg, N. J.
Carlisle Chemical Works, Inc., Reading, Ohio
Carlisle Chemical Works, Inc., Advance Solvents & Chemical Div., New Brunswick, N. J.
Ceramic Color & Chemical Mfg. Co., New Brighton, Pa.
Harshaw Chemical Co., 1945 East 97th St., Cleveland 6, Ohio
International Bartering Co., 52 Broadway, New York 4, N. Y.
Kennametal, Inc., Latrobe, Pa.
Mallinckrodt Chemical Works, St. Louis, Mo.
Miles Metal Corp., 150 Broadway, N. Y. 38, N. Y.
Mooney Chemicals, Inc., Cleveland, Ohio
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.

COLUMBITE-TANTALITE

African Metals Corp., 25 Broad St., New York 4, N. Y.
J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.
Derby & Co., 10 Cedar St., New York 5, N. Y.
E. I. du Pont de Nemours & Co., 1007 Market St., Wilmington, Del.
Fansteel Metallurgical Corp., N. Chicago, Ill.
Foote Mineral Co., 18 W. Chelten Avenue, Philadelphia 44, Pa.
E. A. Godoy & Co., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
Kennametal, Inc., Latrobe, Pa.
Mallinckrodt Chemical Works, 2nd & Mallinckrodt St., St. Louis 7, Mo.
Metal Hydrides Inc., 12-24 Congress St., Beverly, Mass.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Standard Ore & Alloys Corp., 120 Wall St., New York 5, N. Y.
Stauffer Chemical Company, 636 California St., San Francisco 8, Calif.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
Union Carbide Metals Co., Division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.
Wah Chang Corp., 233 Broadway, New York 7, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

COPPER

American Metal Climax Inc., Carteret, N. J.
American Smelting & Refining Co., El Paso, Tex., Hayden, Ariz., Tacoma, Wash.
The Anaconda Co., Anaconda, Mont.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Inspiration Consolidated Copper Co., Inspiration, Ariz.
Intercontinental Metal Corp., 424 Madison Ave., New York 17, N. Y.
International Minerals & Metals Corp., 11 Broadway, New York 6, N. Y.
International Smelting & Refining Co., Miami, Ariz.
Magma Copper Co., Superior, Ariz.
Miles Metal Corp., 150 Broadway, New York 38, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Phelps Dodge Refining Corp., Laurel Hill, N. Y.
Phelps Dodge Corp., Douglas, Ariz., Morenci, Ariz., Ajo, Ariz.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
Tennessee Copper Co., Copperhill, Tenn.

For carloads or small lots

Eighteen convenient smelters and refineries

ASARCO

ASARCO: Buyer, smelter, refiner of gold, silver, lead, copper and zinc ores and blister copper, concentrates, mattes and residues. Fourteen domestic and four Mexican plants located for maximum accessibility as follows:

LEAD SMELTERS
Selby, California
East Helena, Montana
El Paso, Texas
Chihuahua, Chih., Mexico

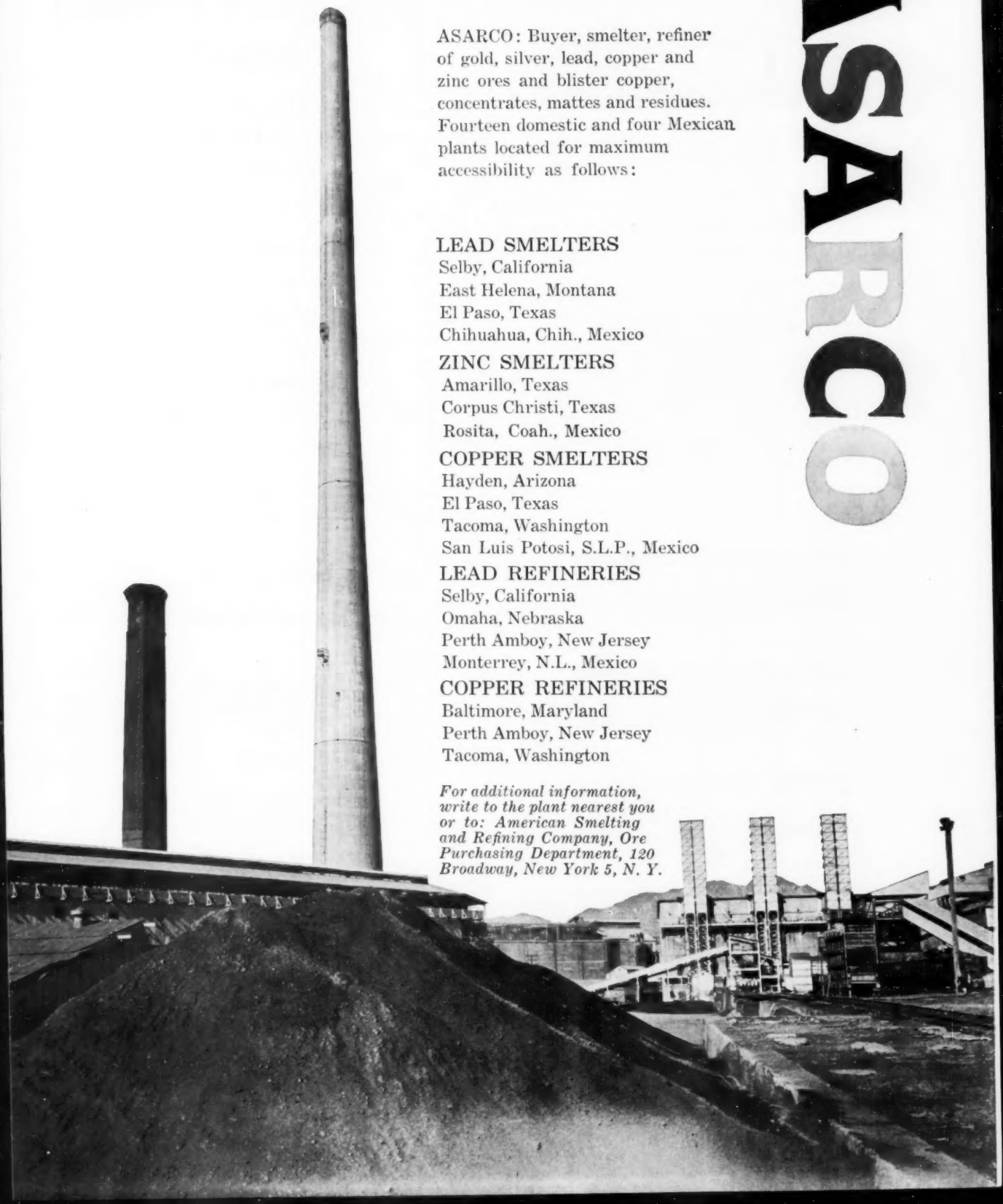
ZINC SMELTERS
Amarillo, Texas
Corpus Christi, Texas
Rosita, Coah., Mexico

COPPER SMELTERS
Hayden, Arizona
El Paso, Texas
Tacoma, Washington
San Luis Potosi, S.L.P., Mexico

LEAD REFINERIES
Selby, California
Omaha, Nebraska
Perth Amboy, New Jersey
Monterrey, N.L., Mexico

COPPER REFINERIES
Baltimore, Maryland
Perth Amboy, New Jersey
Tacoma, Washington

For additional information, write to the plant nearest you or to: American Smelting and Refining Company, Ore Purchasing Department, 120 Broadway, New York 5, N. Y.



AMERICAN ZINC LEAD AND SMELTING COMPANY

Buyers of zinc concentrates suitable for smelting in retort and electrolytic smelting plants.

Address communications to Ore Buying Department

Paul Brown Building
ST. LOUIS, MISSOURI

927 Old National Bank Building
SPOKANE, WASH.

P. O. Box 577
DUMAS, TEXAS

INSPIRATION CONSOLIDATED COPPER COMPANY

formerly
International Smelting and Refining Co.
(Miami Plant)

Buyers of
Copper, Silver and Gold
Ore and Concentrates

Address: Smelting Department
Inspiration Consolidated Copper Co.
Inspiration, Arizona

PURCHASERS OF LEAD AND ZINC CONCENTRATES

THE BUNKER HILL COMPANY

Producers of Top Quality Products

LEAD • ZINC • CADMIUM • SILVER • LEAD AND LEAD ALLOY PRODUCTS • CHEMICAL PRODUCTS

WIRE PHONE WRITE | ORE PURCHASING DEPT. • THE BUNKER HILL COMPANY
Telephone: SUnset 4-1261 • P. O. Box 29, Kellogg, Idaho

International Smelting and Refining Co.

ANACONDA
from mine to consumer

Buyers of

Lead & Zinc Ores
and Concentrates

Lead and Lead-Zinc Smelter
Lead-Zinc Concentrator
} Tooele, Utah

Address: Ore Purchasing Department

International Smelting and Refining Co.

815 Kearns Building
Salt Lake City, Utah

Please establish contact prior to shipment

DIATOMITE

Industrial Minerals & Chemical Co., 836-838 Gilman Street, Berkeley, Calif.
National Filter Media Co., Sales Division of Filter Media Corp., 1719 Dixwell Avenue, New Haven, Conn.
Filpaco Industries, Inc., 2422 South Michigan Ave., Chicago, Ill.
Kraft Chemical Company, 919 West 18 Street, Chicago, Ill.
Minerals & Insulation Co., Inc., 55 Central Avenue, Rochelle Park, N. J.
Johns-Manville Corp., 22 East 40th Street, New York, N. Y.
L. A. Salomon & Brother, 216 Pearl Street, New York, N. Y.
Pomeroy & Fischer Inc., 95 Madison Avenue, New York, N. Y.
West Virginia Pulp & Paper Co., 230 Park Avenue, New York, N. Y.
Whittaker Clark & Daniels Inc., 260 West Broadway, New York, N. Y.

FELDSPAR

(Possible buyers of crude, crushed, or ground)

Akron Porcelain Co., Kenmore Station, Akron, Ohio
Ball Brothers Co., Muncie, Ind.
Corning Glass Works Co., 1943 Crystal St., Corning, N. Y.
Donnelly-Kelley Glass Co., 49 Fenlon St., Holland, Mich.
General Ceramics Co., 30 Rockefeller Plaza, New York, N. Y.
Hazel-Atlas Glass Co., 1942 Dannelberg St., Wheeling, W. Va.
Knox Porcelain Corp., 150 Mynders St., Knoxville, Tenn.
Owens-Illinois Glass Co., Toledo, Ohio
Owens-Pacific Coast Co., 15 H & Folsom Sts., San Francisco, Calif.
Porcelain Products Co., Inc., 1941 Broadway, Parkersburg, W. Va.
Star Porcelain Co., Muirhead & Dewey Aves., Trenton, N. J.
Trenton Potteries Co., Inc., Trenton, N. J.
Wellsville China Co., Wellsville, Ohio

FLUORSPAR

(Brokers or selling agents)

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
Balfour, Guthrie & Co., Los Angeles, Calif.
Bradley & Ekstrom, Inc., 24 California St., San Francisco, Calif.
Continental Ore Co., 500 Fifth Ave., New York City
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
E. I. du Pont de Nemours & Co., 1007 Market St., Wilmington, Del.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
E. A. Gadoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York City, N. Y.
Kerchner, Marshall & Co., Oliver Bldg., Pittsburgh, Pa.
E. J. Lavino & Co., 1528 Walnut St., Philadelphia, Pa.
Mercantile Import & Export Corp., 21 East 40th St., New York City
Mercantile Metal & Ore Corp., 595 Madison Ave., New York City
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Oglebay Norton & Co., Hanna Bldg., Cleveland, O.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
South American Minerals & Merchandise Corp., 425 Park Ave., New York 22, N. Y.
Stauffer Chemical Company, 636 California St., San Francisco 8, Calif.
Whittaker, Clark & Daniels, Inc., 260 West Broadway, New York, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

GERMANIUM

American Metal Climax, Inc., 1270 Avenue of the Americas, New York 20, N. Y.
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
American Zinc, Lead and Smelting Co., 818 Olive St., St. Louis, Mo.
Eagle Picher Co., Mining and Smelting Div., First Nat. Bank Bldg., Miami, Okla.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Sylvania Electric Products, Inc., Towanda, Pa.

GRAPHITE

The Asbury Graphite Mills, Inc., 41 Main St., Asbury, N. J.
Cummings-Moore Graphite Co., 1646 Green Ave., Detroit 9, Mich.
Joseph Dixon Crucible Co., 167 Wayne St., Jersey City 3, N. J.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Charles Pettinos, Inc., 1 E. 42nd St., New York 17, N. Y.
Superior Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United States Graphite Co., 1621 Holland Ave., Saginaw, Mich.

IRON ORE

Acme Steel Co, Newport, Kentucky
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.,
Leonard J. Buck, Inc., One Exchange Place, Jersey City 3, N. J.
Columbia-Geneva Steel Div., U. S. Steel Corp., 120 Montgomery, San Francisco, Calif.
Colorado Fuel & Iron Corp., Pueblo, Colorado
Granite City Steel Co., Box 367, Granite City, Ill.
Hanna Furnace Corp., Grant Bldg., Pittsburgh, Pa.
Inland Steel Co., 3210 Watling St., E. Chicago, Indiana
Interlake Iron Corp., 1900 Union Commerce Bldg., Cleveland 14, Ohio
International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.
Jones & Laughlin Steel Corp., 401 Liberty Ave., Gateway Center, Pittsburgh 30, Pa.
Kaiser Steel Corp., P. O. Box 217, Fontana, Calif.
Lone Star Steel Co., P. O. Box 8087, Dallas 5, Tex.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
National Steel Corp., Grant Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Republic Steel Corp., Republic Bldg., 25 Prospect Ave., N.W., Cleveland 1, Ohio
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Sharon Steel Corp., Sharon, Pa.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal & Iron Div., U. S. Steel Corp., P. O. Box 599, Fairfield, Ala.
U. S. Pipe & Foundry Co., Birmingham, Ala.
U. S. Steel Corp., 525 Wm. Penn Place, Pittsburgh 30, Pa.

LEAD

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
American Metal Climax, Inc., 61 Broadway, New York 6, N. Y.

DRILLS BY VACUUM

HOUSTON

INJECTOR DRILLS

Major companies in all fields rely on modern Houston HI-VACuum Drilling Systems for dependable, 100% true samples . . . Because ONLY Houston can recover ALL of the cuttings ALL of the time.

THE MODEL H.D. 250
THE MIGHTY MIDGET
ALSO CUSTOM BUILT RIGS

For information wire, write or phone

HOUSTON TOOL COMPANY
Box 251, Santa Susana, Calif. • Phone FIreside 6-1114

The 42 LB.
GRIPHOIST
TIRFOR
LIFTS • PULLS
LOWERS
3300 LBS.
Single Line
Capacity increased to 6 TONS with pulley blocks
•
Replaces chain hoists, air hoists, winches . . less cost, less maintenance. Unlimited cable travel, portable, hand operated . . faster, cuts rigging time . . unmatched safety record.
One Year Guarantee
Preferred on job after job, in construction, refineries, oil drilling, plant erection and maintenance, mining, machinery moving, trucking, etc.
See your local dealer
GRIPHOIST, INC.
744 Harrison St., San Francisco 7, Calif.
334 Granite Ave., Boston (Milton 86), Mass.

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
The Bunker Hill Co., Kellogg, Idaho
Combined Metals Reduction Co., Felt Bldg., Salt Lake City, Utah
The Consolidated Mining & Smelting Co., Ltd., Montreal, Canada
Eagle Picher Co., Mining and Smelting Div., P. O. Box 910, Miami, Oklahoma
E. A. Gadoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Intercontinental Metal Corp., 424 Madison Ave., New York 17, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
International Smelting & Refining Co., 25 Broadway, New York 4, N. Y.
Metal Traders, Inc., 26 Broadway, New York 4, N. Y.
Miles Metal Corp., 150 Broadway, New York 38, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
National Lead Company, 111 Broadway, New York, N. Y.
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
United States Smelting Refining & Mining Co., 75 Federal St., Boston, Mass.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

LEPIDOLITE

American Potash & Chemical Corp., 3030 W. 6th St., Los Angeles 54, Calif.
Corning Glass Works, Corning, N. Y.
J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.
General Electric Co., Nela Park, Cleveland, Ohio
E. A. Gadoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Pittsburgh Corning Corp., Port Allegany, Pa.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.

MAGNESITE AND BRUCITE

Basic, Inc., 845 Hanna Bldg., Cleveland 15, Ohio
Corhart Refractories Co., (**Corning Glass Works**), 1662 West Lee St., Louisville, Ky.
E. A. Gadoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif.
Northwest Magnesite Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Pabco Products Inc., 1550 Powell St., Emeryville 8, Calif.
Minerals & Chemicals Philipp Corp., 70 Pine Street, New York 5, N. Y.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Standard Slag Co., 1200 Wick Bldg., Youngstown 1, Ohio
Westvaco Chemical Division, Food Machinery & Chemical Corp., 161 E. 42nd St., New York, N. Y.

MANGANESE ORE

(Metallurgical-grade)

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Leonard J. Buck, Inc., One Exchange Place, Jersey City 3, N. J.
Colorado Fuel and Iron Corp., Pueblo, Colorado
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
Electro Manganese Div., Foote Mineral Co., Knoxville, Tenn.
E. A. Gadoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York City, N. Y.
Keokuk Electro Metals Div. Vanadium Corp. of Amer., Keokuk, Iowa
Minerals & Chemicals Philipp Corp., 70 Pine St., N. Y. 5, N. Y.
National Paint and Manganese Co., Lynchburg, Virginia
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
Tennessee Products and Chemical Corp., 2611 West End Ave., Nashville 5, Tenn.
Tenn-Tex Alloy and Chemical Corp., 2611 West End Ave., Nashville 5, Tenn.
Union Carbide Metals Co., 270 Park Ave., New York 17, N. Y.
United States Steel Co., 525 William Penn Place, Pittsburgh 30, Pa.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

(Battery and chemical-grade)

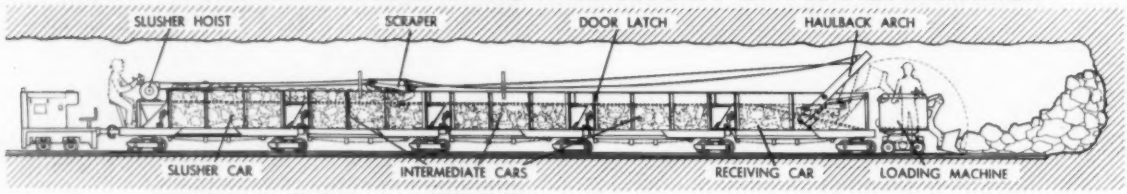
Acme Battery Corp., 200 Henry St., Stamford, Conn.
Burgess Battery Company, Freeport, Ill.
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
General Electric Co., Nela Park, Cleveland 12, Ohio
E. A. Gadoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York City, N. Y.
E. J. Lavino & Co., 3 Penn Center Plaza, Philadelphia 2, Pa.
Mallory Battery Co., Div. of P. R. Mallory & Co., Inc., 13000 Athens Ave., Cleveland, Ohio
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
National Carbon Co., P. O. Box 6087, Cleveland, Ohio
Olin Mathieson Chemical Corp., 225 Winchester Ave., New Haven 4, Conn.
Ray-O-Vac Div., Electric Storage Battery Co., 212 E. Washington Ave., Madison, Wis.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Tennessee Eastman Corp., Kingsport, Tenn.

MERCURY

Allied Chemical Corp., The Solvay Process Div., P. O. Box 271, Syracuse, N. Y.
American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.
American Meter Co., Erie, Pa.
Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
Automatic Steel Products Inc., Mercury Clutch Div., 1201 Camden Ave., S. W., Canton 6, Ohio
Bailey Meter Co., 1052 Ivanhoe Rd., Cleveland 10, Ohio
J. T. Baker Chemical Co., Phillipsburg, N. J.
Wood Ridge Chemical Corp., Woodridge, N. J.; **Coast Chem. Div.**, 275 Brannon St., San Francisco, Cal.
E. I. du Pont de Nemours & Co., Inc., Methods Div., Du Pont Bldg., Wilmington 98, Del.
General Aniline & Film Corp., General Aniline Works Div., 435 Hudson St., New York 14, N. Y.
General Color Co., 24 Avenue B, Newark 5, N. J.
General Electric Co., Purchasing Dept., 1 River Road, Schenectady 5, N. Y.

PUT THE COEUR D'ALENE **Trainloader** TO WORK FOR YOU

NEW SPEED–NEW SAFETY–NEW ECONOMY IN TUNNEL DRIVING!



less expensive — greater profits — and here's why:

The Coeur d'Alene Trainloader is not an experimental design, but a proven performing high-speed tunnel driving unit. Miners and Contractors alike have hailed its time-saving and cost-reducing performance. Here's how it works: After the blast, the Trainloader (consisting of a receiving car, a slusher car, and an optional number of intermediate cars) is pushed into the heading behind the mucking machine. The slusher operator connects into his power source and then tightlines the slusher hoist, automatically raising and locking the haulback arch into loading position. The mucking machine operator is now able to continuously load into the receiving car until the train is completely loaded, or until the heading is cleaned.

The slusher operator keeps the receiving car cleaned out by progressively filling each car to the slusher support bar level and then retreating as the cars become heaped. Two men handle the entire operation. No switching is required — no cars to couple or uncouple—offering tremendous savings in time as well as eliminating one of the most frequent causes of mine accidents. After tunnel driving is completed, the Trainloader may be used for production haulage. Its overlapping design allows continuous spillage-free loading from chutes or conveyors. Consider the savings in labor, time, and expense that a Trainloader will offer your operation and then write, phone or wire the Coeur d'Alenes Company, Wallace, Idaho, USA.

U. S. Patent No. 2,873,866. Canadian Patent No. 709,464. Foreign patents pending.

MANUFACTURERS OF MINE, MILL SMELTER AND LOGGING EQUIPMENT SINCE 1884

...THE COEUR D'ALENES COMPANY WALLACE, IDAHO, U.S.A.

SERVING THE MINING INDUSTRY FOR 77 YEARS

E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Intercontinental Metal Corp., 424 Madison Ave., New York 17, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
International Minerals & Metals Corp., 11 Broadway, New York 6, N. Y.
Mallinckrodt Chemical Works, Jersey City 5, N. J.
Mathieson Chemical Co., Baltimore, Md.
Merck & Co., Inc., Lincoln Ave., Rahway, N. J.
The Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.
Metalsalts Corp., 200 Wagaraw Rd., Hawthorne, N. J.
Miles Metal Corp., 150 Broadway, N. Y. 38, N. Y.
Minneapolis Honeywell Regulator Co., Micro Switch Div., Freeport, Ill., Brown Instrument Div., 4331 Wayne Ave., Philadelphia, Pa.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Phillips Petroleum Co., Bartlesville, Okla.
Piggott Projects, 1057 Howard St., San Francisco 3, Calif.

MICA

(Buyers of Muscovite block, film mica, and phlogopite block mica)

Aerovox Division, Aerovox Corp., 740 Belleville Ave., New Bedford, Mass.
American Mica Insulation Co., 235 Parker Ave., Manasquan, N. J.
Ashville Mica Co., P. O. Box 318 Newport News, Va.
Leonard J. Buck, Inc., One Exchange Place, Jersey City 3, N. J.
Carpenter & Phillips, Box 657, Spruce Pine, N. C.
Diamond Power Specialty Corp., P. O. Box 415, Lancaster, Ohio
Farnam Mfg., Inc., Sweeten Creek Road, Asheville, N. C.
General Electric Co., 1 River Road, Schenectady, N. Y.
Mica Fabricating Company, 53 Central Ave., Rochelle Park, N. J.
Micacraft Products, Inc., 701 McCarter Highway, Newark 5, N. J.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Reliance Mica Co., 341 39th St., Brooklyn, N. Y.
Spruce Pine Mica Co. and Mayland Mfg. Co., Spruce Pine, N. C.
The Tar Heel Mica Co., Inc., Plumtree, N. C.
Western Electric Co., Inc., 195 Broadway, New York 7, N. Y.

MICA GRINDERS

(Buyers of domestic scrap mica)

Concord Mica Corp., 25 Crescent St., Penacook, N. H.—Wet.
International Minerals & Chemical Corp., Old Orchard Road, Skokie, Ill., plants at Erwin, Tenn. and Pueblo, Colo.
Deneen Mica Co., Burnsville, N. C.—Dry.
Diamond Mica Co., 79 Prospect St., Stamford, Conn.
English Mica Co., Spruce Pine, N. C.—Wet and Dry.
Franklin Mineral Products Co., Box 38, Franklin, N. C.—Wet and Dry.
The Funkhouser Co., Hartwell, Georgia—Dry.
Imperial Milling Co., 2738 Merced Ave., El Monte, Calif.
Kings Mountain Mica Co., Inc., Box 709, Kings Mountain, N. C.—Dry.
Southern Mica Co., Johnson City, Tenn.—Dry.

MOLYBDENUM CONCENTRATES

J. T. Baker Chemical Co., Phillipsburg, N. J.
Climax Molybdenum Co., Div. American Metal Climax, Inc., 1270 Ave. of the Americas, N. Y. 24, N. Y.
Crucible Steel Co. of America, Pittsburgh, Pa.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
International Minerals & Metal Corp., 11 Broadway, New York 6, N. Y.
Mallinckrodt Chemical Works, 3600 N. 2nd St., St. Louis, Mo.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Molybdenum Corp., of America, 375 Park Ave., New York, N. Y.
Republic Steel Corp., Canton, Ohio
S. W. Shattuck Chemical Co., Denver, Colo.
Union Carbide Metals Co., Niagara Falls, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

PERLITE

(Producers of expanded perlite)

Airlite Processing Corp., Bldg. 9, Air Base, Vero Beach, Fla.
American Bildrok Co., 2001 W. Pershing Road, Chicago 9, Ill.
Alatex Construction Service, Inc., 3518 Broadway St., New Orleans 18, La.
Buffalo Perlite Corp., 100 Sugg Road (Cheektowaga), Buffalo 21, N. Y.
Florida Perlite Co., 285 West 9th St., Hialeah, Fla.
Great Lakes Carbon Corp., 612 Flower St., Los Angeles 17, Calif.
Gregg Products Co., 646 Chestnut St., S. W., Grand Rapids, Mich.
McClure & Erickson Corp., 2416 Bedessen Ave., Los Angles 22, Calif.
Midwest Perlite Products, Inc., 1120 Railroad St., W. Des Moines, Iowa
Minerals Processing Corp., 520 Van Rensselear St., Syracuse, N. Y.
Minnesota Perlite Corp., 315 W. 86th St., Minneapolis 20, Minn.
National Gypsum Co., 325 Delaware Ave., Buffalo 2, N. Y.
Panacalite Pacific, Inc., 845 E. 60th St., Los Angeles 1, Calif.
Paramount Perlite Co., 16236 S. Illinois St., Paramount, Calif.
Supreme Perlite Co., P. O. Box 66, North Portland, Oregon
Silbrico Corp., 5901 W. 66th St., Chicago 36, Ill.

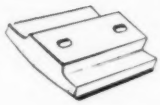
PLATINUM

J. Bishop & Co. Platinum Works, Malvern, Pa.
Engelhard Industries, Inc., 113 Astor Street, Newark 2, N. J.
Goldsmith Bros. Division of National Lead Co., 900 West 18th St., Chicago 80, Ill.
Handy & Harman, 82 Fulton Street, New York 38, N. Y.
Johnson, Matthey & Co., Inc., 608 Fifth Avenue, New York 20, N. Y.
Kastenhuber & Lehrfeld, Inc., 21 West 46th St., New York 36, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
J. A. Samuel & Co., Inc., 165 Broadway, New York 6, N. Y.
Texas Instruments, Inc., Metals & Controls Div., 34 Forest St., Attleboro, Mass.
Wildberg Bros. Smelting & Refining Co., 349 Butler Ave., P. O. Box 468, South San Francisco, Calif.

PYRITE

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
The Anaconda Co., 25 Broadway, New York 4, N. Y.
Associated Metals & Minerals Corp., 75 West St., New York 6, N .Y.
Baugh Chemical Company, Baltimore, Maryland
Davidson Chemical Corporation, 20 Hopkins Place, Baltimore 3, Maryland
Foote Mineral Company, 18 West Chelten Ave., Philadelphia 44, Pa.

Proper Hole Firing Sequence yields
THOROUGH FRAGMENTATION
and CLEAN BREAKS....
you get them when you combine
Spittercord
. . . the superior Igniter Cord designed to ignite any given number of Safety Fuse lengths in a predetermined order, at predetermined intervals, from one or more points of ignition.
and
COAST SAFETY FUSE
BLACK SEQUOIA . . . for warm climate, heavy water pressure
BLUE LABEL . . . for dry or damp agricultural and quarry work
DREADNAUGHT . . . for wet work, cool climate
ORANGE WAX SEQUOIA . . . for maximum visibility
TRIPLE TAPE . . . for very wet work, rough handling
WHITE SEQUOIA . . . for hot climate, heavy water pressure
PRIMACORD-BICKFORD
Hot Wire Fuse Lighters
Detonating Fuse
Safety Fuse
Celokap
COAST MANUFACTURING & SUPPLY CO. ESTABLISHED 1867 LIVERMORE, CAL.
Available from your powder supplier
COAST MANUFACTURING & SUPPLY CO.
LIVERMORE, CALIFORNIA

Call US
FOUNDRIES


Engineered and Quality Controlled Castings
High Strength, Abrasion and Shock Resisting Steels
Alloyed Steels and Irons
Custom Design Assistance
Incorporated 1928
U. S. FOUNDRIES, INC.
1145 QUIVAS STREET
DENVER, COLORADO
KEystone 4-1391
QUALITY HAS NO SUBSTITUTE USF

WORLD'S LEADING MANUFACTURER OF ADVANCED DESIGN PNEUMATIC PLACING EQUIPMENT

PLACE CONCRETE ANYWHERE YOU WANT IT FASTER, EASIER, CHEAPER WITH THE "AIR EXTRUSION" METHOD

No more inaccessible spots or hard-to-get-to pours when you use the AIRPLACO "Air Extrusion" Method of concrete placement. The Airplaco Concrete Placer works above or below ground, right from transit-mixers, carrying materials at a rate up to 35 cu. yds. per hour to any point . . . to any level . . . in any mine. The AIRPLACO Concrete Placer has proved its value in speed, ease, economy and lower maintenance costs for tunnel lining, pressure grouting, blowing sand or pea gravel or transporting structural concrete to common receiving bins.

Put Our Experience on the Job . . . WITHOUT COST
Let our Field Engineers show you how AIRPLACO can measurably cut concrete costs in your mining operation. Years of on-the-job experience are available to you without cost or obligation. Write, wire or phone.

Concrete Placers

Concrete Guns — Wet or Dry

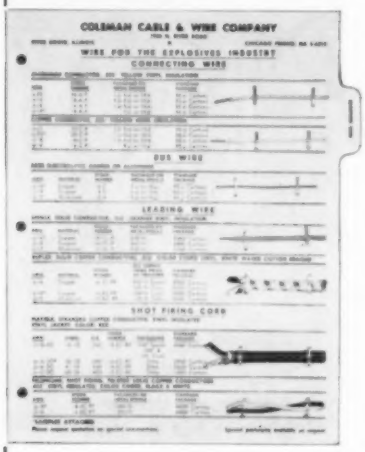
Wet Gun & Grout Pump

Grouters

Mix Elvators

AIRPLACO AIR PLACEMENT EQUIPMENT COMPANY
10108 W 25th St • Kansas City 8, Mo

COLEMAN . . . . . .


COLEMAN CABLE & WIRE COMPANY
WIRE FOR THE EXPLOSIVES INDUSTRY
CONNECTING WIRE
DUO WIRE
LEADING WIRE
SHOT FIRING CORD

ONE Source for **ALL** Blasting Wire and Cable

• • • WRITE for FREE SAMPLE Display Card and Prices.

COLEMAN Cable & Wire Co.
1910 N. River Rd. River Grove, Ill. (A Suburb of Chicago)
Tel. (Chicago) NAtional 5-6215

General Chemical Division, Allied Chemical & Dye Corp., P. O. Box 4040, Denver, Colorado
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Stauffer Chemical Company, 636 California St., San Francisco 8, Calif.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
Woodward & Dickerson, Inc., 1400 Penn Square, Philadelphia, Pa.

RARE-EARTH ORES

(Cerium ores, monazite sand, bastnaesite, other)

American Scandium Corp., Cincinnati, Ohio
Davison Chemical Division, W. R. Grace & Company, Pompton Plains, New Jersey
Lindsay Chemical Division, American Potash and Chemical Corp., West Chicago, Ill.
Lunex Company, Pleasant Valley, Iowa
Maywood Chemical Works, Maywood, New Jersey
Michigan Chemical Company, Saint Louis, Michigan
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
Molybdenum Corporation of America, Pittsburgh, Pennsylvania
Research Chemicals Division, Nuclear Corp. of America, Burbank, Calif.
St. Eloi Corporation, Newtown Station, Cincinnati, Ohio
Mallinckrodt Chemical Works, St. Louis, Missouri
Vitro Chemical Company, Chattanooga, Tennessee

SELENIUM

Allied Chemical Corp., 40 Rector St., New York 6, N. Y.
International Smelting & Refining Co., 25 Broadway, New York, N. Y.
Kawecki Chemical Co., Boyertown, Pa.
Kennecott Sales Corp., 161 East 42nd St., New York 17, N. Y.

SPODUMENE

Corning Glass Works, Corning, N. Y.
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R. Hanover Square, New York City, N. Y.
Lithium Corp. of America, Inc., 500 Fifth Ave., New York 36, N. Y.
Maywood Chemical Works, Maywood, N. J.
Minerals & Chemicals Philipp Corp., 70 Pine Street, New York 5, N. Y.
National Enameling and Stamping Co., 270 N. 12th St., Milwaukee, Wis.
Owens Corning Fiberglas Corp., Newark, Ohio
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.

STRONTIUM ORES

Associated Metals & Minerals Corp., 75 West St., New York, N. Y.
J. T. Baker Chemical Co., Phillipsburg, N. J.
Continental Ore Corp., 500 Fifth Ave., New York, N. Y.
E. I. du Pont de Nemours & Co., Inc., 11th & Orange Sts., Wilmington, Del.
Foote Mineral Co., Inc., 18 W. Chelten Ave., Philadelphia, Pa. (minerals).
General Electric Co., 1 River Road, Schenectady, N. Y.
Chas. Hardy, 415 Lexington Ave., New York, N. Y.
Harshaw Chemical Co., 1933 E. 97th St., Clevelnad, Ohio
Miles Metal Corp., 150 Broadway, N. Y. 38, N. Y.
Oglebay Norton & Co., Hanna Bldg., Cleveland, Ohio
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Westvaco Min. Prod. Div., Food Machinery & Chemical Corp., Modesto, Calif.

TALC

(Producers and grinders of crude talc, pyrophyllite and soapstone)

Alberene Stone Corp. of Va., Schuyler, Va.
Blue Ridge Talc Co., Inc., Henry, Va.
Carolina Pyrophyllite Co., Staley, N. C.
Commercial Minerals Co., 310 Irwin St., San Francisco, Calif.
Eastern Magnesia Talc Co., Inc., 206 Bank St., Burlington, Vt.
Glendon Prophyllite Co., Staley, N. C.
Gouverneur Talc Co., Inc., Gouverneur, N. Y.
Huntley Industrial Minerals, Inc., Box 305, Bishop, Calif.
Industrial Minerals & Chemical Co., 6th & Gilman St., Berkeley, Calif.
Southern Talc Co., Chatsworth, Ga.
Southwestern Talc Corp., Llano, Texas
Stauffer Chemical Co., P. O. Box 68, N. Portland, Ore.

TANTALITE (SEE COLUMBITE) TIN

American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Grace & Co., W. R., Hanover Square, New York City, N. Y.
C. Tennant, Sons & Co., 100 Park Ave., New York 17, N. Y.
Vulcan Detinning Div., Vulcan Materials Co., Sewaren, N. J.
Wah Chang Corp., Woolworth Bldg., New York 7, N. Y.

TITANIUM MINERALS

(Titanium metal manufacturers—Ilmenite and rutile)

E. I. du Pont de Nemours and Co., Inc., DuPont Bldg., Wilmington 98, Del.
Reactive Metals Corp., Warren Avenue, Niles, Ohio
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Stauffer Chemical Company, 636 California St., San Francisco 8, Calif.
Titanium Metals Corp. of America, 233 Broadway, New York, N. Y.
Union Carbide Metals Co., Div. of Union Carbide and Carbon Corp., Ashtabula, Ohio and 30 East 42nd St., New York 7, New York

(Pigment manufacturers—Ilmenite)

American Cyanamid Co., Pigments Div., 30 Rockefeller Plaza, New York 20, N. Y.
E. I. du Pont de Nemours and Co., Inc., DuPont Bldg., Wilmington 98, Del.
The Glidden Co., Chemicals-Pigments-Metals Div., 900 Union Commerce Bldg., Cleveland 14, Ohio
National Lead Co., 111 Broadway, New York 6, N. Y.
New Jersey Zinc Co., Gloucester City, N. J.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.

(Welding rod manufacturers—Ilmenite and rutile)

American Brake Shoe Co., 230 Park Ave., New York 17, N. Y.
Stoody Co., Slauson Ave. at Sorenson, Whittier, Calif.
Westinghouse Electric Corp., Box 2278, Pittsburgh 30, Pa.

(Dealers—Ilmenite)

J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Metallurg, Inc., 99 Park Ave., New York 16, N. Y.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
C. Tennant, Sons & Co., 100 Park Ave., New York, N. Y.

(Dealers—Rutile)

Berkshire Chemicals, Inc., 420 Lexington Ave., New York 17, N. Y.
Foote Minerals Co., Inc., 18 W. Chelten Ave., Philadelphia 44, Pa.
Metallurg, Inc., 99 Park Ave., New York 16, N. Y.
International Titanium Corp., 100 Park Ave., New York 17, N. Y.
Metal Traders, Inc., 67 Wall St., New York 5, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine Street, New York 5, N. Y.
Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.

TUNGSTEN CONCENTRATES

Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
Continental Ore Corp., 500 Fifth Ave., New York 36, N. Y.
J. E. De Sousa Co., Inc., 217 Broadway, New York 7, N. Y.
Derby & Co., 10 Cedar St., New York 5, N. Y.
Fansteel Metallurgical Corp., 2200 Sheridan Road, North Chicago, Ill.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
General Electric Co., Cleveland Wire Works, Lamp Dept., 1331 Chardon Road, Euclid 17, Ohio
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R. Hanover Square, New York City, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
Jones & Laughlin, Stainless Steel Dept., Box 4606, Detroit 34, Mich.
Kennametal, Inc., Latrobe, Pa.
Latrobe Steel Co., Latrobe, Pa.
Metallurg, Inc., 99 Park Ave., New York, N. Y.
Molybdenum Corp. of America, 375 Park Ave., New York, N. Y.
North Metal & Chemical Corp., York, Pa.
Reading Chemicals, Box 2119, Wyomissing, Pa.
Salt Lake Tungsten Co., 2160 Indiana Ave., Salt Lake City, Utah
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Simonds Saw and Steel Co., Lockport, N. Y.
Sylvania Electric Products Co., Tungsten & Chemical Division, Box 70, Towanda, Pa.
South American Mineral & Merchandise Corp., 425 Park Ave., New York 22, N. Y.
C. Tennant Sons & Co., 100 Park Ave., New York, N. Y.
Union Carbide Nuclear Co., 270 Park Ave., New York, N. Y.; Bishop, Calif.
Universal Cyclops Steel Corp., Bridgeville, Pa.
Vanadium Alloy Steel Co., Latrobe, Pa.
Vulcan Kidd Steel Div., H. K. Porter Co., Aliquippa, Pa.
Wah Chang Corporation, Woolworth Building, New York 7, N. Y.
Wells Manufacturing, 7800 North Austin Ave., Skokie, Ill.
Westinghouse Electric Corp., 1071 MacArthur Ave., Bloomfield, N. J.

ZINC

The American Metal Co., Climax, Inc., 1270 Ave. of the Americas, New York 20, N. Y.
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
American Zinc Co. of Illinois, 1600 Paul Brown Bldg., St. Louis, Mo.
The Anaconda Co., 25 Broadway, New York 4, N. Y.
Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y.
The Athletic Mining and Smelting Co., Box 540, Ft. Smith, Ark.
The Bunker Hill Co., P. O. Box 29, Kellogg, Idaho
Combined Metals Reduction Co., Felt Bldg., Salt Lake City, Utah
E. I. du Pont de Nemours & Co., 1007 Market St., Wilmington 98, Del.
Eagle-Picher Co., Mining & Smelting Div., Miami, Okla.
E. A. Godoy & Co., Inc., 25 Broadway, New York 4, N. Y.
Grace & Co., W. R., Hanover Square, New York 8, N. Y.
Intercontinental Metal Corp., 424 Madison Ave., New York 17, N. Y.
International Bartering Co., 52 Broadway, New York 4, N. Y.
International Minerals & Metals Corp., 11 Broadway, New York 4, N. Y.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Metal Traders, Inc., 26 Broadway, New York, N. Y.
Miles Metal Corp., 150 Broadway, N. Y. 38, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine St., New York 5, N. Y.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.
The Sherwin-Williams Co., Ozark Smelting & Mining Division, 101 Prospect Ave., N.W., Cleveland 1, Ohio

ZIRCON

Associated Metals and Minerals Corp., 75 West St., New York 6, N. Y.
Berkshire Chemicals, Inc., 630 3rd Ave., New York 17, N. Y.
Carborundum Metals Company, P. O. Box 32, Akron, N. Y.
Continental Mineral Processing Corp., P. O. Box 8-T, Sharonville, Ohio
Continental Ore Corp., 500 Fifth Ave., New York, N. Y.
Corhart Refractories Company, 1600 W. Lee Street, Louisville 10, Ky.
de Poorter, Jan, Inc., 60 E. 42nd St., New York 17, N. Y.
Foote Mineral Company, 18 W. Chelten Ave., Philadelphia 44, Penn.
Lava Crucible Refractories Company, First National Bank Building, Pittsburgh, Penn.
Metal & Thermit Corp., 100 Park Ave., New York 17, N. Y.
Metal Traders, Inc., 26 Broadway, New York 5, N. Y.
Metallurg, Inc., 99 Park Avenue, New York 17, N. Y.
Minerals & Chemicals Philipp Corp., 70 Pine Street, New York 5, N. Y.
Norton Company, 1 New Bond Street, Worcester, Mass.
Pacific Graphite Company, Inc., 40th & Linden Streets, Oakland, Calif.
Frank Samuel & Co., 2 Penn Center Plaza, Philadelphia 2, Pa.
Stauffer Chemical Company, 636 California St., San Francisco 8, Calif.
C. Taylor Sons, Company, 715 Burns St., P. O. Box 58, Cincinnati 14, Ohio
Titanium Alloy Mfg. Div., 111 Broadway, New York 6, N. Y.
Union Carbide Metals Corp., 30 E. 42nd St., New York 17, N. Y.
Wah Chang Corp., 233 Broadway, New York 7, N. Y.

W.R. GRACE & CO.

HANOVER SQUARE, NEW YORK CITY

Members of The Commodity Exchange, Inc.

ORES • METALS

ANTIMONY · COPPER · LEAD
TIN · ZINC, ETC.

CHROME · MANGANESE
TUNGSTEN, ETC.

1-MAN ORE MILL

PROCESSES 10 TO 15 TONS DAILY
WITH UP TO 98% RECOVERY!

ORE-BEE is a modern masterpiece of mining machinery! A complete, portable Crusher-Pulverizer-Concentrator in one unit, easily moved by skid or truck, can be operated by one man! Gives increased recovery and output by up to 70%, makes processing of even low grade ore profitable. Inexpensive. Get the complete story today.

WRITE TODAY FOR FREE
ILLUSTRATED FOLDER TO

ORE-BEE MILLS, Inc.
811 SOUTH 1ST STREET YAKIMA, WASHINGTON

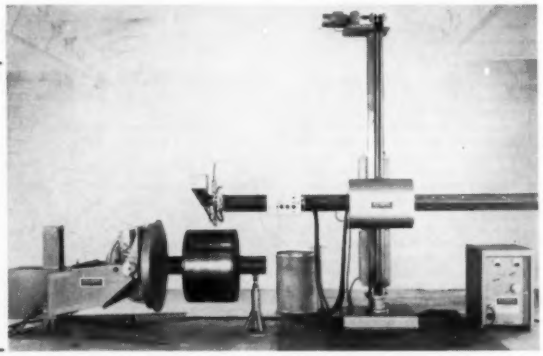
Announcing **3** **NEW STOODY**

Automatic Welding Systems!

Stoody has long been the recognized leader in alloy wires for automatic hard-facing as well as for hard-facing rods and electrodes. No other manufacturer offers equal experience or a product line so versatile and complete.

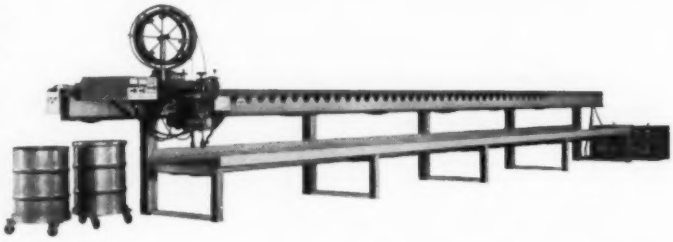
Now Stoody augments the best hard-facing materials available to industry *with a whole new line of automatic welding machines* covering specialized and general needs. Before investing in any automatic welding machines check with Stoody . . . pioneers and developers in the field of hard-facing, *manufacturers of the latest designs in AUTOMATIC WELDING SYSTEMS!*

1 **STOODY CRUSHERMATIC**—A compact, versatile system for automatically rebuilding and hard-facing crusher rolls in position. It enables the welder to work outside the crusher chassis in comfort and clean air. The Crushermatic consists of a motorized carriage riding a track which is suspended over the crusher roll. Wire is supplied to the carriage by any standard semi-automatic wire feeding unit. Uses a 400 amp power supply but 600 amps are preferable. Versatile electronic controls provide proper sequencing for a *variety of circumferential and transverse welding patterns.* The Crushermatic is portable by one man and is slipped into permanently welded brackets when in use. *It deposits up to 20 lbs. per hour—300% to 400% faster than manual welding and 200% faster than hand-held semi-automatic welding.*



2 **STOODY MODEL U W UNIVERSAL AUTOMATIC WELDER**—The Model U W provides a complete welding system capable of cylindrical, conical and straight line welding. The 3000 lb. capacity positioner *tilts the workpiece through a 120° angle and is equipped with power elevation and thyratron controlled rotation.* All electrical controls are unitized in a *portable control panel* for maximum operator convenience. *Ram type manipulator* has a vertical travel from 6" to 8'-6"; Horizontal travel: 10'; Travel speed range: 5 imp to approximately 60 ipm. Manipulator mast *rotates through 360°.* Power source: *DC, constant potential selenium rectifier type.* Input: 220-440 V, Output: 500 amps at 40 V 100% duty cycle. 5 point slope control.

3 **STOODY MODEL T L DUAL-HEAD TRACK LINK WELDER**—Provides dual welding heads with wires supplied from twin Payoffpaks for fast, efficient rebuilding and hard-facing. Extremely rugged construction. Features: *Special gear-type wire feed rolls; positive high frequency starters; wider, lower bed for easier accessibility and greater capacity; heavy-duty double worm reduction gear box with DC variable speed travel drive motor. Unitized control panel.* Bed length 40'; Bed width 46"; Bed height only 24"; Power: 2-500 amp constant voltage 100% duty cycle 220-440 V power sources.



• *For full information on all STOODY AUTOMATIC WELDING SYSTEMS see your Stoody dealer (check the Yellow Pages of your phone book) or write direct.*

STOODY COMPANY
11932 East Slauson Avenue • Whittier, California

1961 Catalog Index of Equipment and Manufacturers

MINING WORLD

compiled by Mining World's research staff

The catalog index is comprised of two sections: **Section I** is an alphabetical listing of the specialized products and equipment used by the mine-mill-smelter industry. All principal manufacturers of these products and equipment are listed for your convenience. **Section II** is an alphabetical list of all principal manufacturers and their addresses.

The names of manufacturers who are represented in this issue by catalogs or advertisements are printed in boldface type in Sections I and II. The page numbers of their catalogs or advertisements are also given in Section II.

Every effort has been made to make your MINING WORLD Catalog, Survey & Directory Number as complete and accurate as possible. MINING WORLD, however, cannot be responsible for changes in names, addresses and other discrepancies.

Section I
EQUIPMENT INDEX

Section I contains an alphabetical list of product and equipment names. Wherever feasible, equipment has been indexed under headings representing the nomenclature preferred by the industry or, in many cases, under the principal proper noun. For example, "Flotation machines" are indexed as such rather than under the all-encompassing heading "Machines." Rock drills, however, have been most logically listed as "Drills, rock." European terms have been retained where applicable and understandable.

ACETYLENE
See Welding Equipment

ACID
See Reagents and Chemicals

ACTUATORS
See Cylinders and Actuators

AERIAL SURVEYING
See Exploration Services

AGGLOMERATING EQUIPMENT
See Pelletizers and Nodulizers

AGITATORS AND CONDITIONERS
American M.A.N. Corp.
Bethlehem Steel Co.
Booth Co., Inc., The
DENVER EQUIPMENT CO.
DENVER SUPER—SEE DENVER EQUIPMENT CO.
DIESEL ENERGY CORP.—SEE KLOCKNER-HUMBOLDT-DEUTZ, AG
DORR-OLIVER CORP.
Dravo Corp.
EIMCO CORP.
Gallagher Co., The
HARDINGE CO., INC.
Hirsch Brothers Machinery Co., Inc.
Infilco, Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
Miners Foundry & Mfg. Co.
Mixing Equipment Co.
Morse Bros. Machinery Co.
National Tank & Pipe Co.
Philadelphia Gear Works, Inc.
SMIDTH & CO., F. L.
Standard Electric Mfg. Co., Inc.
Telluride Iron Works Co.
WESTERN MACHINERY CO., WEMCO DIV.
Westinghouse Air Brake Co., Le Roi Div.

AIRCRAFT
See Exploration Services

AIR DRIVEN TOOLS
See Tools, Air Driven

AIR LEG
ACKER DRILL CO., INC.
ATLAS COPCO, INC.
CHICAGO PNEUMATIC TOOL CO.
Cleveland Div., Westinghouse Air Brake Co.
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
MACHINERY CENTER, INC.
Telluride Iron Works
Thor Power Tool Co.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.

AMALGAMATORS
CLARK-TODD—SEE MINE & SMELTER SUPPLY CO., THE
DENVER EQUIPMENT CO.
Mill & Mine Supply, Inc.
MINE & SMELTER SUPPLY CO.
Scott-Concentrators
Telluride Iron Works
Yuba Consolidated Industries Inc.

ASSAY EQUIPMENT

Continuous Electronic Assaying Devices
See Laboratory Equipment and Supplies
Bico, Inc.
Philips Electronic Instruments
Uranium Instruments Co.
Van Waters & Rogers, Inc., Braun Chemical Div.
Van Waters & Rogers, Inc., Braun-Knecht-Heimann Co. Div.

ASSAY SUPPLIES
See Laboratory Equipment

ASSAYERS
See Laboratories & Assayers

AUGERS
See Drills; Bits

BAG FILLING MACHINES
Bemis Bro. Bag Co.
Haver & Boecker
Richardson Scale Co.

BAGS

Blasting, Tamping
Bemis Bro. Bag Co.
Hercules Powder Co.
Olin Mathieson Chemical Corp.
Pickard Industries Inc.
Trojan Powder Co.

Filter Bags
American Air Filter Co., Inc.
American Machine & Metals, Inc. Filtration Engineers Div.
Arizona Bag Co.
Bemis Bro. Bag Co.
Coast Mfg. & Supply Co., Fiber Glass Div.
EIMCO CORP.
Hazemag USA, Inc.
Filtration Engineers Div., American Machine & Metals, Inc.
Filter Fabrics, Inc.
Menardi & Co.
National Filter Media Corp.
Northern Blower Corp.
PETERSON FILTERS & ENGINEERING CORP.
Pendleton Woolen Mills
Technical Fabricators, Inc.
Westinghouse Air Brake Co., Le Roi Div.
Wheelabrator Corp.

Ore and Concentrate Bags
Arizona Bag Co.
Bemis Bro. Bag Co.
Crown Zellerbach Corp.
Filter Fabrics, Inc.

Sample Bags
Arizona Bag Co.
Bemis Bro. Bag Co.
Filter Fabrics, Inc.
Hammond Bag & Paper Co.
Hanover Industries, Inc.
Pioneer Geochemical Surveys Inc.
Van Waters & Rogers Inc., Braun Chemical Div.

BALL MILLS
See Grinding Equipment

BALLS
See Grinding Equipment

BATTERIES
See also Safety Equipment

Automotive and Light Plant

Assoc. Electrical Industries Ltd.
Electric Autolite Co.
C&D Batteries, Div.
ELECTRIC STORAGE BATTERY CO., THE EXIDE INDUSTRIAL DIV.
The General Tire & Rubber Co.
Gould-National Batteries, Inc.
Graybar Electric Co.
Ray-O-Vac Co.
Willson Products Div.
United States Rubber Co.

Locomotive

Assoc. Electrical Industries, Inc.
C&D Batteries, Div.
C&D Sylver-Clad—see C&D Batteries, Inc.
Edison Inc., Thomas A.
Electric Autolite Co.
ELECTRIC STORAGE BATTERY CO., THE EXIDE INDUSTRIAL DIV.
Gould-National Batteries, Inc.
McGraw-Edison Co.

BATTERY CHARGERS

See Chargers, Battery

BEARINGS

Ball

Dodge Manufacturing Corp.
General Motors Corp., New Departure Div.
Kugelfischer Georg Schafer & Co.
Link-Belt Co.
Marlin Rockwell Corp.
Nice Ball Bearing Co.
SKF Industries Inc.
Stephens-Adamson Mfg. Co.

Pillow Blocks

Chain Belt Co.
Continental Conveyor & Equip. Co.
Dodge Manufacturing Corp.
General Motors Corp., New Departure Div.
Graphite Metallizing Corp.
HEWITT-ROBINS
Link-Belt Co.
Jeffrey Mfg. Co.
Kugelfischer Georg Schafer & Co.
McNally Pittsburgh Mfg. Corp.
SKF Industries, Inc.
Stephens-Adamson Mfg. Co.

Roller

Chain Belt Co.
Dodge Manufacturing Co.
Link-Belt Co.
McNally Pittsburgh Mfg. Corp.
Pollard Bearings Ltd.
SKF Industries, Inc., Tyson Bearing Co. Div.
TIMKEN ROLLER BEARING CO., THE

Sleeve

AMERICAN BRAKE SHOE CO.
Ampco Metal, Inc.
Continental Conveyor & Equip. Co.
Dodge Manufacturing Corp.
Gatke Corporation
Graphite Metallizing Corp.
Hirsch Brothers Machinery Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Ohio Carbon Co., The
SKF Hellefors Jernverk
Stearns-Roger Mfg. Co.

BELL SYSTEMS

See Communications

BELTS AND BELTING

See also Conveyor Equipment; Fasteners, Belt; Safety Equipment

Chain Link and Metal

American Chain & Cable Co., Inc. American Chain Div.
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
COLORADO FUEL & IRON CORP., Conveyor Co., The
ESCO Corp.
Greening & Sons Ltd., N.
Hack Engineering Co.
HEWITT-ROBINS
Link-Belt Co.
Morse Chain Co.
Stephens-Adamson Mfg. Co.
United Statse Rubber Co.
United States Steel

Flat Belts

AJAX—see HEWITT-ROBINS
American Biltrite Rubber Co. Inc., Boston Woven Hose & Rubber Div.
American Rubber Mfg. Co.
Barber-Greene Co.
Challenger—see Lee Rubber & Tire Corp., Republic Rubber Div.
CONSERVO—see HEWITT-ROBINS
Conveyor Co., The
Gates Rubber Co.
GOODALL RUBBER CO.
Goodrich Industrial Products Co.
Goodyear Tire & Rubber Co.
HEWITT-ROBINS
Lee Rubber & Tire Corp., Republic Rubber Div.
Porter Company, Inc., H. K., Thermoid Div.
Quaker Rubber Co.
Raybestos-Manhattan, Inc.
Reliance Electric & Engineering Co.
Rhoads, J. E., & Sons
Rost & Co., H.
United States Rubber Co.
Yosemite—see American Rubber Mfg. Co.

Leather Belting

Carlyle Rubber Co., Inc.
Dodge Manufacturing Corp.
Gates Rubber Co.
GOODALL RUBBER CO.
Houghton & Co., E. F.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Rhoads, J. E. & Sons
Tannate—see Rhoads & Sons, J. E.
Vim-Tred—see Houghton & Co., E.F.

Rubber Belting

American Biltrite Rubber Co., Inc., Boston Woven Hose & Rubber Div.
Conveyor Co., The
Gates Rubber Co.
Goodrich Industrial Products Co., B. F. Goodyear Tire & Rubber Co.
HEWITT-ROBINS
Lee Rubber & Tire Corp., Republic Rubber Div.
Morse Chain Co.
Porter Co., H. K., Thermoid Div.
Reliance Electric & Engineering Co.
Rost & Co., H.
Stephens-Adamson Mfg. Co.
United States Rubber Co.

V-Belts

Allis-Chalmers Mfg. Co., Industries Group
American Biltrite Rubber Co., Boston Woven Hose & Rubber Div.
Carlyle Rubber Co., Inc.
Conveyor Co., The
Dayton Rubber Co.
Dodge Manufacturing Corp.
Gates Rubber Co.
GOODALL RUBBER CO.
Goodrich Industrial Products Co., B. F. Goodyear Tire & Rubber Co.
HEWITT-ROBINS
Lee Rubber & Tire Corp., Republic Rubber Div.
Link-Belt Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Porter Co., Inc., H. K., Thermoid Div.
Quaker Rubber Co.
Raybestos-Manhattan, Inc.
Reliance Electric & Engineering Co.
Rost & Co., H.
Stephens-Adamson Mfg. Co.
Texrope—see Allis-Chalmers Mfg. Co., Industries Group
United States Rubber Co.
Worthington Corp.

BINS, CHUTES, HOPPERS & ACCESSORIES

See also Feeders

Bins and Chutes

Allison Steel Mfg. Co.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
AMSCO—see AMERICAN BRAKE SHOE CO.
Barber-Greene Co.
Bethlehem Steel Co.
Butler Mfg. Co.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Columbian Steel Tank Co.
Com-Bin Feeder—see Pulva Corp.
Conveyor Co., The
Eagle Crusher Co., Inc.
Gebruder Hischmann Maschinenfabrik
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Goodrich Tire Co., The B. F.
Hammermills Inc.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Hydraulic Supply Mfg. Co.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Koehring Co., Johnson Co., C. S. subsid.
Landis Steel Co.
LINATEX CORP. OF AMERICA
Link-Belt Co.
Lippmann Engineering Works
Mace Co., The
M-H Standard Corp.
Mayo Tunnel & Mine Equip.
McNally Pittsburgh Mfg. Corp.
Miners Foundry & Mfg. Co.
NATIONAL IRON CO.
Pettibone-Mulliken Corp.
Poor & Co., Inc., Pioneer Engr. Div.
Porter Co., Inc., H. K.
Richardson Scale Co.
Rogers Iron Works Co.
Sanford-Day Iron Works, Inc.
Smith Engineering Works
SPANG & CO.
Stearns-Roger Mfg. Co.
Stephens-Adamson Mfg. Co.
STURTEVANT MILL CO.
Telluride Iron Works Co.
United States Steel Co.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Washington Machinery Co.

Gates, Lips, etc.

Allison Steel Mfg. Co.
Aluminum Co. of America
AMERICAN MNGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
CARD IRON WORKS CO, THE C. S.
Chain Belt Co.
Conveyor Co., The
Hack Engineering Co.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
Koehring Co., Johnson Co., C. S.
Link-Belt Co.
Lippmann Engineering Works
McNally Pittsburgh Mfg. Corp.
NATIONAL IRON CO.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Pioneer Engineering Div., Poor & Co., Inc.
Richardson Scale Co.
Roberts & Schaefer Co.
Sanford-Day Iron Works, Inc.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Telluride Iron Works Co.
Universal Engineering Corp.
United States Steel Co.
Washington Machinery Co.

Indicators

Bin-Dicator Co., The
Convair
Conveyor Co., The
DENVER EQUIPMENT CO.
Euclid Electric & Mfg. Co., The
Gardner & Co., Ralph C.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Jeffrey Mfg. Co.
Koehring Co., Johnson Co., C. S.
McNally Pittsburgh Mfg. Corp.
Richardson Scale Co.

Lining

American Brake Shoe Co.
American Biltrite Rubber Co., Inc., Boston Woven Hose & Rubber Div.
Calumet & Hecla, Inc., Calumet Div.
Carborundum Co., The, Refractories Div.
Colonial Plastics Mfg. Co., The Industrial Div.
Conveyor Co., The
Goodrich Industrial Products Co., B. F. Goodyear Tire & Rubber Co.
Hirsch Brothers Machinery Co., Inc.
LINATEX CORP. OF AMERICA
Stephens-Adamson Mfg. Co.
Stonhard Co. Inc.
Wilkinson Rubber Linatex Ltd.
Windeler Co., Ltd., George

Vibrators

Barber-Greene Co.
Carpco Mfg. Inc.
Carrier Conveyor Corp.
Cleveland Vibrator Co., The
DENVER EQUIPMENT CO.
English Electric Co. Ltd.
Eriez Manufacturing Co.
GARDNER-DENVER CO.
HEWITT-ROBINS
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works
Stephens-Adamson Mfg. Co.
Syntron Co.
Tyler Co., The W. S.
Universal Engineering Corp.

BITS

See also Steel; Diamond Bit Resetting Service; Tungsten Carbide Products

Auger Bits

ACKER DRILL CO., INC.
AMERICAN BRAKE SHOE CO.
Carboloy—see General Electric Co., Metallurgical Products Dept.
Cardox Corp.
Central Mine Equipment Co.
COEUR D'ALENES CO., THE
DIAMOND DRILL CONTRACTING CO.
Failing Co., George E.
Firth Sterling, Inc.
GARDNER-DENVER CO.
General Electric Co., Metallurgic Prods. Dept.
Holman Bros. Ltd.
Kennametal Inc.
Koehring Co., Kwik-Mix Co. Div.
Koehring Co.
Link-Belt Co.
Mobile Drilling Inc.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Salem Tool Co.
Thor Power Tool Co.
Vascoloy-Ramet Corp.

Churn Bits

Bucyrus-Erie Co.
General Electric Co., Carboloy Dept.
Kennametal Inc.
Mobile Drilling Inc.
SPANG & CO.
Westinghouse Air Brake Co., Le Roi Div.

Cutting Machine

Bowdil Co., The
Firth Sterling Inc.
General Electric Co., Metallurgic Prods. Dept.
Goodman Mfg. Co.
Jeffrey Mfg. Co.
Kennametal Inc.
Penn Machine Co.
Pennsylvania Drilling Co., Penndrill Div.
Vascoloy-Ramet Corp.

Diamond Bits

ACKER DRILL CO., INC.
American Coldset Corp.
ATLAS COPCO INC.
Bowdil Co., The
BOYLES BROS. DRILLING CO.
BOYLES BROS. DRILLING CO., LTD. (CANADA)
CHICAGO PNEUMATIC TOOL CO.
Christensen Diamond Products Co.
DIAMOND DRILL CONTRACTING CO.
DIAMOND TOOL RESEARCH CO., INC.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., George E.
General Electric Co., Carboloy Dept.
Havlick, J. L.
JOY MANUFACTURING CO.
Koebel Diamond Tool Co.
LONGYEAR CO., E. J.
MCCLINTOCK CO., R. S.
Mobile Drilling Inc.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
SMIT & CO., INC., ANTON
J. K. Smit & Sons, Inc.
SPRAGUE & HENWOOD, INC.
Thor Power Tool Co.
VAREL MANUFACTURING CO.
Wheel Truing Tool Co.
WINK CORP., F. W.

Percussion Bits

American Coldset Corp.
ATLAS COPCO, INC.
Brunner & Lay, Inc.
Bucyrus-Erie Co.
Christensen Diamond Products Co.
Cleveland Rock Drill Div., Westinghouse Air Brake Co.
FAGERSTA STEELS PACIFIC, INC.
Failing Co., George E.
Firth Sterling, Inc.
GARDNER-DENVER CO.
General Electric Co., Metllurgical Prods. Dept.
Hillman Co., Inc., C. Kirk
Holman Bros. Ltd. (England)
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Kennametal Inc.
Koehring Co.
McCauley Industrial Corp.
Metal Carbides Corp.
Minerals Engineering Co. (Colo.)
Mobile Drilling Inc.
SANDVIK COROMANT—see ATLAS COPCO
Sandvik Steel Inc.
SCHRAMM, INC.
SECURITY ENGINEERING DIV., DRESSER INDUSTRIES, INC.
Sheffield Hollow Drill Steel Co. Ltd.
SPANG & CO.
Textron Inc., Homelite Div.
Thor Power Tool Co.
Throwaway Bit Corp.
TIMKEN ROLLER BEARING CO., THE
Uddeholms Co. of America Inc.
Vascoloy-Ramet Corp.
WESTERN ROCK BIT MANUFACTURING CO.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.

Rotary Bits

ACKER DRILL CO., INC.
Bedford & Sons Ltd., John
Brunner & Lay, Inc.
Central Mine Equipment Co.
CHICAGO PNEUMATIC TOOL CO.
Christensen Diamond Products Co.
DIAMOND DRILL CONTRACTING CO.
Drilling Accessory & Mfg. Co., Inc.
FAGERSTA STEELS PACIFIC, INC.
Failing Co., Geo. E.
Firth-Sterling, Inc.
GARDNER-DENVER CO.
General Electric Co., Metallurgical Prods. Dept.
Hawthorne Inc., Herb J.
Hitchcock Mfg. Co., Leo
Holman Bros. Ltd.
HUGHES TOOL CO.
JOY MANUFACTURING CO.
Kennametal Inc.
Kerfmaster—see Central Mine Equipment Co.
Koehring Co.
Koehring Co., Kwik-Mix Co. Div.
LONGYEAR CO., E. J.
Mayhew Machine & Supply Co.
Mine Safety Appliances Co.
Mobile Drilling Inc.
Oil Tool Mfg. Co.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
SECURITY ENGINEERING DIV., DRESSER INDUSTRIES INC.
Smit & Co., Inc., Anton
Smith Tool Co.
SPRAGUE & HENWOOD, INC.
Stanco Mfg. & Sales, Inc.
Thor Power Tool Co.
VAREL MANUFACTURING CO.
Vascoloy-Ramet Corp.
Westinghouse Air Brake Co., Le Roi Div.
Winter Weiss Co., The

BLASTING SUPPLIES

See also Bags

Ammonium Nitrate

American Cyanamid Co., Explosives & Mining Chemicals Dept.
Collier Carbon & Chemical Corp.
Olin Mathieson Chemical Corp.
Spencer Chemical Co.
Trojan Powder Co.

Blasting Machines

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Apache Powder Co.
Atlas Powder Co.
COEUR D'ALENES CO., THE
du Pont de Nemours & Co., E. I., Explosives Div.
Electro-Technical Labs
Hercules Powder Co.
Mine Safety Appliances Co.
Olin Mathieson Chemical Corp.
Shot Master—see Atlas Powder Co.
Trojan Powder Co.

Detonating Fuses

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
AMERICAN CYANAMID CO., ORGANIC CHEMICALS DIV.
Apache Powder Co.
Atlas Powder Co.
COAST MFG. & SUPPLY CO., FUSE DIV.
COEUR D'ALENES CO., THE
du Pont de Nemours & Co., E. I., Explosives Div.
Ensign Bickford Co.
Hercules Powder Co.
National Fuse & Powder Co.
Olin Mathieson Chemical Corp.
Trico Fuse Mfg. Co.
Trojan Powder Co.

Electric Caps

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Apache Powder Co.
Atlas Powder Co.
COEUR D'ALENES CO., THE
du Pont de Nemours & Co., Inc., E. I., Explosives Div.
Hercules Powder Co.
Olin Mathieson Chemical Corp.
Spencer Chemical Co.
Trojan Powder Co.

Explosives

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICAL DEPT.
Apache Powder Co.
Atlas Powder Co.
COEUR D'ALENES CO., THE
Collier Carbon & Chemical Corp.
du Pont de Nemours & Co., Inc., E. I., Explosives Div.
Hercules Powder Co.
Illinois Powder Mfg. Co.
International Geophysics, Inc.
Olin Mathieson Chemical Corp.
Spencer Chemical Co.
Trojan Powder Co.

Safety Fuses

AMERICAN CYANAMID CO., EXPLOSIVES & MINING DEPT.
Apache Powder Co.
Atlas Powder Co.
COAST MFG. & SUPPLY CO., FUSE DIV.
COEUR D'ALENES CO., THE
du Pont de Nemours & Co., E. I., Explosives Div.
Ensign Bickford Co.
Hercules Powder Co.
National Fuse & Powder Co.
Olin Mathieson Chemical Corp.
Trojan Powder Co.

Accessories—other than above

AIR PLACEMENT EQUIPMENT
AMERICAN BRATTICE CLOTH CORP.
AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICAL DEPT.
Apache Powder Co.
Atlas Powder Co.
Bemis Bros Bag Co.
COAST MFG. & SUPPLY CO., FUSE DIV.
COEUR D'ALENES CO., THE
COLEMAN CABLE & WIRE CO.
du Pont de Nemours & Co., Inc., E. I., Explosives Div.
Economy Fuse & Mfg. Co.
Ensign-Bickford Co.
Hercules Powder Co.
Johnson Loading Supplies, G. R.
Mine Safety Appliances Co.
National Fuse & Powder Co.
National Mine Service Co.
Olin Mathieson Chemical Corp.
Trico Fuse Mfg. Co.
Trojan Powder Co.

BLOCKS & SHEAVES

See also Conveyor Equipment

Allis-Chalmers Mfg. Co., Industries Group, Export Div.
ALLOY STEEL & METALS CO.
American Brake Shoe Co.
American Hoist & Derrick Co., Crosby-Laughlin Div.
American Hoist & Derrick Co.
AMSCO—see American Brake Shoe Co.
Armco Steel Corp., National Supply Div.
Bethlehem Steel Co.
CARD IRON WORKS CO., THE C. S.
CHICAGO PNEUMATIC TOOL CO.
Connellsville Corp.
Demag Aktiengesellschaft
Dodge Manufacturing Corp.
Durolite—see Sauerman Bros., Inc.
Failing Co., Geo. E.
Gates Rubber Co.
Griphoist, Inc.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., The
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
LAKE SHORE INC.
MCLANAHAN CORP.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
National Supply Co., The
Ohio Hoist & Mfg. Co.
PACIFIC—see ALLOY STEEL & METALS CO.
PAUL E. KEENEY CO.
RIBLET TRAMWAY CO.
ROPE MASTER—see PAUL E. KEENEY CO.
Sanford-Day Iron Works, Inc.
SALA MASKINFABRIKS AB
Sauerman Bros. Inc.
SKOOKUM CO.
Stephens-Adamson Mfg. Co.
Taper-Lock—see Dodge Mfg. Cop.
Telluride Iron Works
Tool Steel Gear & Pinion Co., The
Vulcan Iron Works Co. (Colo.)
Washington Iron Works
Worthington Corp.

BLOWERS

See Ventilation Equipment and Blowers

BLUEPRINT MACHINES

See Copy Machines

BODIES

See Trucks and Trailers; Mine Cars

BOLTS, ROCK, ROOF AND ACCESSORIES

ALIMAK CORP.
Allison Steel Mfg. Co.
American Forge Co., The, Pacific States Steel Div.
Bethlehem Steel Co.
COLORADO FUEL & IRON CORP.
Commercial Shearing & Stamping Co.
Dowty Mining Equipment Ltd.
Elreco Corp., The
FAGERSTA STEELS PACIFIC, INC.
Holman Bros. Ltd.
International Harvester Co.
MACHINERY CENTER, INC.
Ohio Brass Co.
Porter Co., Inc., H. K., Connors Steel Div.
Republic Steel Corp.
Republic Steel Corp., Bolt & Nut Div.
Sheffield Steel Div., Armco Steel Corp.
Telluride Iron Works
U. S. Steel Corp., Tennessee Coal & Iron Div.
Youngstown Sheet & Tube Co., The

BOOM ASSEMBLIES

See Drills; Excavators and Attachments

BORTZ

See Diamonds, Industrial

BRAKES, DRUMS AND MECHANISMS LINING

See Friction Material

BRUSHES, ELECTRICAL

See Electrical Equipment

BUCKETS AND TEETH

Clamshell

Benoto Inc.
Blaw-Knox Co., Blaw-Knox Div.
COEUR D'ALENES CO., THE
Esco Corp.
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Heyl & Patterson, Inc.
Koehring Co.
Link Belt Speeder Corp.
McDowell Co., Inc.
Owen Bucket Co., The
Pettibone-Mulliken Corp.
Schield Bantam Co. Inc.
Williams—see McDowell Co., Inc.

Dragline

Bucyrus-Erie Co.
Crescent—see Sauerman Bros., Inc.
ESCO Corp.
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Koehring Co.
McDowell Co., Inc.
Page Engineering Co.
Pettibone-Mulliken Corp.
Sauerman Bros. Inc.
Schield Bantam Co. Inc.

Dredge

American Brake Shoe Co.
Benoto Inc.
COLUMBIA STEEL CASTINGS CO., INC.
ESCO Corp.
Gar Wood Industries, Inc.
Harsco Corp., Taylor-Wharton Co., Div.
I.H.C. Holland
McDowell Co., Inc.
Priestman Bros., Ltd.
Williams—see McDowell Co., Inc.
Yuba Consolidated Indus., Mining Div.

Shovel

American Brake Shoe Co.
Benoto Inc.
Bucyrus-Erie Co.
ESCO Corp.
Gar Wood Industries, Inc.
Harsco Corp., Taylor-Wharton Co., Div.
Koehring Co.
LIBU SHOVEL CO. AB
Pettibone-Mulliken Corp.
Schield Bantam Co. Inc.

Teeth

Allied Steel & Tractor Products, Inc.
American Brake Shoe Co.
American Forge Co., The, Pacific States Steel Corp. Div.
American Steel Foundries
Bucyrus-Erie Co.
COLUMBIA STEEL CASTINGS CO., INC.
ESCO Corp.
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Harsco Corp., Taylor-Wharton Co., Div.
Hensley Equipment Co. Inc.
Joost Manufacturing Co.
Koehring Co.
McDowell Co., Inc.
NATIONAL IRON CO.
NATIONAL MALLEABLE & STEEL CASTINGS
Owen Bucket Co., The
Schield Bantam Co. Inc.
Page Engineering Co.

BUILDINGS, PREFABRICATED

Allison Steel Mfg. Co.
Aluminum Co. of America
Bethlehem Steel Co.
Blaw-Knox Co., Blaw-Knox Div.
Butler Mfg. Co.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

HARNISCHFEGER CORP.
Hirsch Brothers Machinery Co., The
Republic Steel Corp.
SPANG & CO.
United States Steel Corp.

BULLDOZERS

See Tractors and Attachments

BURNERS, OIL, GAS AND COAL

Babcock & Wilcox Co., The
Bico, Inc.
Coppus Engineering Corp.
Denver Fire Clay Co., The
Enterprise Engine & Machine Co.
Farris Flexible Valve Corp.
General Motors Corp.
Kennedy-Van Saun Mfg. & Eng. Corp.
Klockner-Humboldt, Deutz, AG
Mace Co., The
MINE & SMELTER SUPPLY CO.
National Airoil Burner Co.
SOUTHWESTERN ENGINEERING CO.

BUYERS OF ORE AND CONCENTRATES

See "Possible Markets Ores, Metals and Non-metallics," elsewhere in this edition

CABLE AND CONDUIT

See also Rope, Wire; Tramway, Aerial

Electrical Cable and Conduit

ACEC
Alcoa, Rome Cable Div.
Aluminum Co. of America
Anaconda Wire & Cable Co.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Bethlehem Steel Co.
British Insulated Callenders Cables Ltd.
Canada Wire & Cable Co., Ltd.
Carol Cable Co.
Chase Brass & Copper Co.
Circle Wire & Cable Corp.
COLEMAN CABLE & WIRE CO.
Collyer Insulated Wire Co.
Colonial Plastics Mfg. Co., The Industrial Div.
Essex Wire Corp., Paranite Wire & Cable Div.
Essex Wire Corp., Industrial Wire Prods. Wire & Cable Div.
GENERAL CABLE CORP.
General Electric Co., Wire & Cable Dept.
Graybar Electric Co.
INTERNATIONAL NICKEL CO.
JOHNS-MANVILLE SALES CORP. (ASBESTOS CEMENT)
JOY MANUFACTURING CO.
Kraylay Chemtrol Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIVISION
Mosebach Manufacturing Co.
National Mine Service Co.
National Supply Co., The
Okonite Company, The
Phelps Dodge Copper Products Corp.
Porter Co., Inc., H. K., National Electric Div.
ROEBLING'S SONS CORP., JOHN A., DIV. COLORADO FUEL & IRON CO.
Republic Steel Corp.
Simplex Wire & Cable Co.
SPANG & CO.
Tennessee Coal & Iron Div., U.S.S. Corp.
TWECO Products, Inc.
United States Rubber Co.
U. S. Steel Corp., American Steel & Wire Div.
United States Steel Corp., Columbia Geneva Steel Div.
Western Insulated Wire Co.
Youngstown Sheet & Tube Co., The

Cable, Trailing

Alcoa, Rome Cable Div.
Assoc. Electrical Industries Ltd.
British Insulated Callenders Cables, Ltd.
Circle Wire & Cable Corp.
COLEMAN CABLE & WIRE CO.
Collyer Insulated Wire Company
Essex Wire Corp., Industrial Wire Prods., Wire & Cable Div.
GENERAL CABLE CORP.
General Electric Co., Wire & Cable Dept.
INTERNATIONAL NICKEL CO.
Mosebach Manufacturing Co.
National Mine Service Co.
Okonite Co., The
Phelps Dodge Copper Products Corp.
Porter Co., Inc., H. K., National Electric Div.
United States Steel, Columbia-Geneva Div.

CABLEWAYS, EXCAVATING

See Excavators

CAGES

See Hoisting Equipment

CALCINERS

See Dryers and Kilns; Pyrometallurgical Equipment

CAPS

See Blasting Supplies

CARBIDE PRODUCTS

See Tungsten Carbide Products

CAR DUMPERS

Alliance Machine Co.
Allis-Chalmers Mfg. Co.
American Hoist & Derrick Co.
American M.A.N. Corp.
ATLAS COPCO INC.
Bush Engineering & Mfg. Co.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Connellsville Corp.
Differential Steel Car Co.
General Electric Co.
Hirsch Brothers Machinery Co. Inc.
Heyl & Patterson, Inc.
Hudson Ltd., Robert
Irwin-Sensenich Corp.
LAKE SHORE INC.
Link-Belt Co.
McNally Pittsburgh Mfg. Corp.
Nolan Co., The
Rogers Iron Works Co.

CAR PASSERS

AMERICAN MINE DOOR CO.
ATLAS COPCO INC.
CARD IRON WORKS, THE C. S.
COEUR D'ALENES CO., THE
Connellsville Corp.
Hudson Ltd., Robert
Mayo Tunnel & Mine Equipment

CAR SHAKERS

See Shakers, Car

CARS, MINE

See also Haulage Units, Off-rail
A C F Industries, Inc., American Car & Foundry Div.
Allison Steel Mfg. Co.
American M. A. N. Corp.
Atlas Car & Mfg. Co., The
BALDWIN-LIMA-HAMILTON CORP.
Bethlehem Steel Co.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
DENVER EQUIPMENT CO.
Differential Steel Car Co.
Easton Car & Construction Co.
GARDNER-DENVER COMPANY
GETMAN BROTHERS MFG. CO.
Hirsch Brothers Machinery Co.
Hudson Ltd., Robert
Irwin-Sensenich Corp.
K-W Dart Truck Co.
Kaiser Steel Corp.
LAKE SHORE INC.
LOHED—see LAKE SHORE, INC.
Magor Car Corp.
Mayo Tunnel & Mine Equipment
NATIONAL IRON CO.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Pacific Car & Foundry Co.
Rogers Iron Works Co.
Sanford-Day Iron Works Inc.
SCOOT-CRETE ORE CARRIER—see GETMAN BROS. MFG. CO.
Telluride Iron Works
Union Iron Works
U. S. Steel Corp., Columbia Steel Div.
U. S. Steel Corp.
Westinghouse Air Brake Co., Le Roi Div.

CELLS, FLOTATION

See Flotation Machines

CHAIN AND ACCESSORIES

(Covering only companies cataloging these products)
American Brake Shoe Co.
American Hoist & Derrick Co., Crosby-Laughlin Div.
American Chain & Cable Co., Inc., American Chain Div.
Athey Products Corp.
Bowdil Co., The
Chain Belt
Diamond Chain Co., Inc.
ESCO Corp.
HEWITT-ROBINS
Link-Belt Co.
Morse Chain Co.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Page Engineering Co.
Stephens-Adamson Mfg. Co.

CHAIN HOISTS

Allison Steel Mfg. Co.
American Chain & Cable Co., Inc., American Chain Div.
American Chain & Cable Co., Wright Hoist Div.
ASEA ELECTRIC INC.
ATLAS COPCO INC.
J. H. Channon Corp.
CHICAGO PNEUMATIC TOOL CO.
GARDNER-DENVER CO.
Graybar Electric Co.
HARNISCHFEGER CORP.
INGERSOLL-RAND CO.
Loadking—see Yale & Towne Mfg. Co.
Lug-All Co., The
Morse Chain Co.
Republic Steel Corp.
Robbins & Myers, Inc.
Thor Power Tool Co.

CHARGERS, BATTERY

ACEC
Acme Electric Corp.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Electric Autolite Co., C&D Batteries Div.
ELECTRIC STORAGE BATTERY CO., THE EXIDE INDUSTRIAL DIV.
English Electric Co. Ltd.
Fairbanks, Morse & Co.
General Electric Co., Apparatus Sales Div.
Goodman Manufacturing Company, Mancha Storage Battery Locomotive Div.
Gould-National Batteries, Inc.
Graybar Electric Co.
Greensburg Mach. Co.
Hobart Brothers Co.
Katolight Corp.
Kohler Co.
Lincoln Electric Co., The
McGraw Edison Co.
Mine Safety Appliances Co.
National Mine Service Co.
Sheppard Co., R. H.
Studebaker-Packard Corp., Onan Div.
Syntron Co.
Ward Leonard Electric Co.
Westinghouse Electric Corp.

CHEMICAL CONCENTRATORS

See Concentrating Equipment

CHEMICALS

See Reagents and Chemicals

CHIMNEYS

Van Waters & Rogers Inc., Braun-Knecht-Heimann Co. Div.

CHUTES

See Bins, Chutes, and Accessories; Feeders

CLAMPS

See Couplings, Hose; Rope, Wire, and Accessories

CLARIFIERS

See Filters, Concentrate; Thickeners and Tanks

CLASSIFIERS

See also Cyclones

Air

Buell Engineering Co., Inc.
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
Gebruder Hischmann Maschinenfabrik
General Electric Co.
HARDINGE CO., INC.
Hazemag U.S.A., Inc.
Hirsch Brothers Machinery Co., Inc.
James Equipment, Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG (DIESEL ENERGY CORP.)
Loesche, Germany
Majac Inc.
McNally Pittsburgh Mfg. Co.
Roberts & Schaefer
Scott—Concentrators
STURTEVANT MILL CO.
Universal Road Machinery Co.
Williams Patent Crusher & Pulverizer Co.

Hydraulic

AKINS—see MINE & SMELTER SUPPLY CO., THE
Bush Engineering & Mfg. Co.
DEISTER CONCENTRATOR CO., INC., THE
Deister Machine Co.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
Eagle Iron Works
EQUIPMENT ENGINEERS INC.
General Electric Co.
HARDINGE CO., INC.
Heyl & Patterson, Inc.
Kennedy-Van Saun Mfg. & Eng.
MCLANAHAN CORP.
McNally Pittsburgh Mfg. Co.
MINE & SMELTER SUPPLY CO., THE
Rogers Iron Works Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Telluride Iron Works Co.
WESTERN MACHINERY CO., WEMCO DIV.
Wilkinson Rubber Linatex Ltd.

Mechanical

AKINS—see MINE & SMELTER SUPPLY CO.
Bird Machine Co.
Buell Engineering Co.
Bush Engineering & Mfg. Co.
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
Eagle Iron Works
Gebruder Hischmann Maschinenfabrik
HARDINGE CO., INC.
Hirsch Brothers Machinery Co., Inc.
Holman Bros. Ltd.
Iowa Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Lippmann Engineering Works
Magnetic Engineering & Mfg. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Morse Bros. Machinery Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
STURTEVANT MILL CO.
Union Iron Works
Western Gear Corp.
WESTERN MACHINERY CO., WEMCO DIV.
Williams Patent Crusher & Pulverizer Co.

CLEANERS

See Filters; Scrubbers

CLOTH

See Filter Media; Screens, Grizzlies and Accessories; Ventilation Equipment

CLOTHING

See Safety Equipment

CLUTCH MECHANISMS

See also Friction Material
Dodge Manufacturing Co.
Eaton Mfg. Co., Dynamatic Div.

General Motors Corp., New Departure Div.
Link-Belt Co., Export Div.
Morse Chain Co.
Rolling-Grip—see Dodge Mfg. Co.
Stephens-Adamson Mfg. Co.
Twin Disc Clutch Co.

COLLECTORS

See Dust Collection Equipment
Reagents and Chemicals

COMMUNICATIONS

Bell and Buzzer Systems

ACEC
Assoc. Electrical Industries Ltd.
Connecticut Telephone & Electric Corp.
John Davis & Son, Ltd.
Graybar Electric Co.
Rodale Mfg. Co. Inc.
U. S. Instrument Corp.

Mine Telephones

ACEC
Assoc. Electrical Industries Ltd.
Connecticut Telephone & Electric Corp.
Graybar Electric Co.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Mine Safety Appliances Co.
Simplex Wire & Cable Co.
U. S. Instrument Corp.

Radio Systems

ACEC
Assoc. Electrical Industries Ltd.
Collins Radio Corp.
Fairchild Camera & Instrument Corp., Allen B. DuMont Labs., Div.
General Electric Co.
Graybar Electric Co.
International Geophysics Inc.
Mine Safety Appliances Co.
Motorola Communications & Electronics, Inc.
Westinghouse Electric International Co.

Television, Industrial

ACEC
Dickinson Laboratories, Inc.
Fairbanks, Morse & Co.
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
Mine Safety Appliances Co.
National Mine Service Co.

Trolley Telephones

ACEC
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Mine Safety Appliances Co.
National Mine Service Co.
U. S. Instrument Corp.

COMPRESSORS & ACCESSORIES

Portable

Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
ATLAS COPCO INC.
Carrier Corp.
CHICAGO PNEUMATIC TOOL CO.
Cooper-Bessemer Co., The
Davey Compressor Co.
Demag Aktiengesellschaft
Fairbanks, Morse & Co.
GARDNER-DENVER CO.
Gyro-Flow—see Ingersoll-Rand Co.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
Jaeger Machine Co., The
JOY MANUFACTURING CO.
K S B, Klein, Schanzlin & Becker AG
Le Roi Div., Westinghouse Air Brake Co.
Lincoln Engineering Co. Div., McNeil Machine & Engr. Co.
Mission Manufacturing Co.
Mosebach Electric & Supply, Mosebach Mfg. Co.
Olin Mathieson Chemical Corp.
SCHRAMM INC.
Solar Aircraft Co.
Texas Gulf Sulphur Co.
UNTAIR—see JOY MANUFACTURING CO.
Westinghouse Air Brake Co., Le Roi Div.
Westinghouse Air Brake Co. (Penna.)
Worthington Corp.

Stationary

Allis-Chalmers Mfg. Co., Industries Group
American Blower Div. of American Standard
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Assoc. Electrical Industries Ltd.
ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Cooper-Bessemer Corp., The
Davey Compressor Co.
Dresser Industries Inc., Roots-Connersville Blowers Div.
Fairbanks, Morse & Co.
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
Jaeger Machine Co., The
JOY MANUFACTURING CO.
K S B, Klein, Schanzlin & Becker AG
Lima Electric Motor Co., The
Lincoln Engineering Co., Div., McNeil Machine & Engr. Co.
Mannesmann-Meer AG
Mannesmann-Export GmbH
Olin Mathieson Chemical Corp.
SCHRAMM INC.
Texas Gulf Sulphur Co.
Westinghouse Air Brake Co., Industrial Products Div.
Westinghouse Air Brake Co., Le Roi Div.
Worthington Corp.

COMPUTERS AND DATA PROCESSING EQUIPMENT

Assoc. Electrical Industries Ltd.
Bailey Meter Co.
Bendix Corp., The, Bendix Computer Div.
Burroughs Corporation
English Electric Co. Ltd.
Fischer & Porter Co.
Foxboro Co., The
General Electric Co. Apparatus Sales Div.
Geodynamics Inc.
Leeds & Northrup Co.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Monroe Calculating Machine Co.
Montan-Forschung GmbH
Texas Instruments Inc., Industrial Products Group
Western Computing Consultants, Mining Div.

CONCENTRATING EQUIPMENT

See also Classifiers; Flotation Machines, Magnetic Equipment; Grinding Equipment; Crushers; Separators

Chemical Concentrators

DENVER EQUIPMENT CO.
Infilco, Inc.
Kennedy-Van Saun Mfg. & Co.
Scott Concentrators
Stearns—Roger Mfg. Co.
WESTERN MACHINERY CO.

Heavy Media Separation

AKINS—see MINE & SMELTER SUPPLY CO., THE
Allis-Chalmers Mfg. Co., Industries Group
Bush Engineering & Mfg. Co.
Dings Magnetic Separator Co.
DORR-OLIVER INC.
Dravo Corp.
Eagle Iron Works
Eriez Manufacturing Co.
Filter Fabrics, Inc.
Hammermills Inc.
HARDINGE CO., INC.
HEWITT-ROBINS
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co., Inc.
Hostachem Corp. (Ferrosilicon)
Jeffrey Manufacturing Co.
Kennedy-Van Saun Mfg. & Engr. Corp.
KLOECKNER-HUMBOLDT DEUTZ AG—DIESEL ENERGY CORP.
Knapsack-Greisham AG, see Hostachem Corp.
Link-Belt Co.
Magnetic Engineering & Mfg. Co.
McNally Pittsburgh Mfg. Co.
MINE & SMELTER SUPPLY CO.
Morse Bros. Mach. Co.
Ore & Chemical Corp., The
Osborne Laboratories, Inc., Raymond G.
Scott Concentrators
Simplicity Engineering Co.
Southwestern Engineering Co.
Stearns Magnetic Products Div., The Indiana General Corp.
Stearns-Roger Mfg. Co., The
Tennant Sons & Co., C., of N.Y.
Universal Road Machinery Co.
WESTERN MACHINERY CO., WEMCO DIV.

Ion Exchange Equipment

Allis Chalmers Mfg. Co.
DORR-OLIVER INC.
Infilco, Inc.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Stearns-Roger Mfg. Co., The

Jigs

Bendelari, F. N.
COEUR D'ALENE'S CO., THE
Davis Foundry & Machinery Wks.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
General Electric Co.
Hirsch Brothers Machinery Co. Inc.
James Equipment, Inc.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. Co.
Link-Belt Co.
MCLANAHAN CORP.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO.
Morse Bros. Machinery Co.
Rogers Iron Works Co.
Scott—Concentrators
Universal Dredge Mfg. Co.
WESTERN MACHINERY CO., WEMCO DIV.
Yuba Consolidated Industries, Inc.

Spiral Concentrators

DENVER EQUIPMENT CO.
Eagle Iron Works
Hirsch Brothers Machinery Co., Inc.
Humphreys Engineering Co.
Jeffrey Mfg. Co.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.

Tables

BUCKMAN TILING CONCENTRATOR—see DENVER EQUIP. CO.
CONCENCO—see DEISTER CONCENTRATOR CO., THE
DEISTER CONCENTRATOR CO. INC., THE
Deister Machine Co.
DENVER EQUIPMENT CO.
Hirsch Brothers Machinery Co., Inc.
Holman Bros. Ltd.
James Equipment Inc.
LINATEX CORP. OF AMERICA
Link-Belt Co.
MINE & SMELTER SUPPLY CO.
Morse Bros. Machinery Co.
Osborne Laboratories, Inc., Raymond G.
Scott-Concentrators
Straub Mfg. Co. Inc.
WILFLEY—see MINE & SMELTER SUPPLY CO., THE

CONCRETING EQUIPMENT, UNDERGROUND

See also Grouting
AIR PLACEMENT EQUIP. CO.
Blaw-Knox Co.
CARD IRON WORKS CO., THE C. S.
Cement Gun Co.
Chain Belt Co.
CHICAGO PNEUMATIC TOOL CO.
Gunite—see Cement Gun Co.
Jaeger Machine Co., The
Mayo Tunnel & Mine Equipment
Ridley Co.
Textron Inc., Homelite Div.
Thor Power Tool Co.
Zimmerman Manufacturing Co.

CONDITIONERS

See Agitators and Conditioners; Engine Exhaust Conditioners

CONDUIT

See Cable and Conduit

CONSTRUCTION, MINE PLANT

See Plant Design and Construction

CONSULTING ENGINEERS

Geological

BOYLES BROS. DRILLING CO.
CHAPMAN, WOOD & GRISWOLD
Elliott, D. H.
Frederick, Francis H.
Geodynamics Inc.
Geo-Optic Paper Corp.
Gould & Co., Gordon I.
Heinrichs Geoexploration Co.
Kaiser Engineers
C. P. Keegle, Engineers
MACAFEE & CO.
Pioneer Geochemical Surveys Inc.
Mineral Engineers
Minerals Engineering Co.
Turner & Associates, Samuel F.
Western Consultants Inc.
Wilson Exploration Co.

Geophysical

Aero Service Corp.
Allied Geophysics
Geodynamics Inc.
Geo-Optic Paper Corp.
Geophysical Specialties Co.
Heinrichs Geoexploration Co.
Mineral Engineers
Turner & Associates, Samuel F.
Wilson Exploration Co.

Industrial

Braun & Co., C. F.
Geodynamics Inc.
Hack Engineering Co.
Heinrichs Geoexploration Co.
Kaiser Engineers
Mannesmann-Meer AG
Menlo Research Laboratory
Meissner Engineers Inc.
Mineral Engineers
SOUTHWESTERN ENGINEERING CO.
STEARNS-ROGER MFG. CO., THE
Universal Dredge Mfg. Co.

Metallurgical

Booth Co., Inc., The
Braun & Co., C. F.
BURBRIDGE-PYBURN
Carpco Manufacturing Inc.
CHAPMAN, WOOD & GRISWOLD
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
ESCO Corp.
Galigher Co., The
Geodynamics, Inc.
Gould & Co., Gordon I.
Hack Engineering Co.
ABBOTT HANKS, INC.
James Equipment Inc.
Kaiser Engineers
C. P. Keegal, Engineers
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Ledoux & Co. Inc.
Liquid-Solid Separations Ltd.
LOTTRIDGE-THOMAS & ASSOC.
LURGI GmbH
MACAFEE & CO.
Mace Co., The
McDowell Co., Inc.
Meissner Engineers Inc.
Mineral Engineers
Minerals Engineering Co.
SOUTHWESTERN ENGINEERING CO.
Stearns Magnetic Products Div., The Indiana General Corp.
Stearns-Roger Mfg. Co., The
Treadwell Co. Inc., M. H.
Walvoord, Inc., O. W.
WOLFE & ASSOC.

Mining

BOYLES BROS. DRILLING CO.
BURBRIDGE-PYBURN
Carpco Mfg. Inc.
CHAPMAN, WOOD & GRISWOLD

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Cowin & Co. Inc.
Dale, Wade M.
DORR-OLIVER INC.
Dowty Mining Equipment Ltd.
Frederick, Francis H.
Geodynamics, Inc.
Geo-Optic & Paper Corp.
Gould & Co., Gordon I.
Hack Engineering Co.
Heinrichs Geoexploration Co.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Industrial Physics & Electronics Co.
Ingersoll, Guy E.
Kaiser Engineers
C. P. Keegel, Engineers
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Live Roller Mills Mfg. Co.
LONGYEAR CO., E. J.
LOOFBOUROW, R. L.
LOTTRIDGE, THOMAS & ASSOC.
Macafee & Co.
Mace Co., The
MACHINERY CENTER INC.
Meissner Engineers Inc.
Mineral Engineers
Minerals Engineering Co.
Pierce, Roger V.
Rogers Iron Works Co.
Schaefer & Associates, F. C.
Scheidenhelm, F. W.
Scott—Concentrators
SOUTHWESTERN ENGINEERING CO.
Stearns-Roger Mfg. Co., The
STILL & STILL
Treadwell Co. Inc., M. H.
Turner & Associates
Vulcan Iron Works Co.
Westinghouse Electric Corp.
WISSER & COX
Wilson Exploration Co.
WOLFE & ASSOC.
World Mining Consultants Inc.

CONTINUOUS MINERS

Goodman Manufacturing Co.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
National Mine Service Co.
Westinghouse Air Brake Co., Le Roi Div.

CONTRACTING SERVICES

See also Exploration Services; Plant Design and Construction

Mine Development

Cowin & Co., Inc.
Geodynamics, Inc.
Isbell Construction Co.
Mineral Engineers

Mining

Fisher Contracting Co.
Geodynamics Inc.
MACHINERY CENTER INC.
Meissner Engineers
Mineral Engineers

Shaft Sinking

Cowin & Co., Inc.
Dravo Corp.
Live Roller Mills Mfg. Co.
MACHINERY CENTER INC.
Meissner Engineers
Mineral Engineers

Stripping

Fisher Contracting Co.
Isbell Construction Co.
MACHINERY CENTER INC.
Meissner Engineers
Mineral Engineers

CONTROLS

See also Gauges and Scales

ELECTRIC MOTOR

ACEC
Allis-Chalmers Mfg. Co., Industries Group
Louis Allis Co.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Carpco Mfg. Inc.
Daystrom Inc., Weston Instrument Div.
Electric Machinery Mfg. Co.
English Electric Co. Ltd.
Gardner, Ralph C. & Co.
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Mosebach Manufacturing Co.
Reliance Electric & Engineering Co.
Shepard Niles Crane & Hoist Corp.
Square D. Co. E C & M Div.
Texas Instruments Inc., Industrial Products Group
U. S. Electrical Motors Inc.
Wadsworth Elec. Mfg. Co., Inc.
Westinghouse Electric Corp.

Electronic

ABC Scale Div., The McDowell Co.
ACEC
Allis-Chalmers Mfg. Co.
Assoc. Electrical Industries Ltd.
Atkins Technical Inc.
Bailey Meter Co.
Barber-Colman Co., Industrial Instruments Div.
Bristol Co., The
Cooper-Bessemer Corp., The
Daystrom, Inc., Weston Instruments Div.
English Electric Co. Ltd.
Fielden Electronics Ltd.
Fischer & Porter Co.
Foxboro Co., The
General Electric Co., Apparatus Sales Div.
Graybar Electric Co., Inc.
Howe Scale Co.
Industrial Nucleonics Corp.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Leeds & Northrup Co.
Mine Safety Appliances Co.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Philips Electronic Instruments
RAMSEY ENGINEERING CO.
Reliance Electric & Engineering Co.
Research-Cottrell, Inc.
Richardson Scale Co.
Texas Instruments Inc., Industrial Products Group
Westinghouse Electric Corp.

Hydraulic

ACEC
American Brake Shoe Co.
Bristol Co.
Commercial Shearing & Stamping Co.
Dowty Mining Equipment Ltd.
Fischer & Porter Co.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Infilco, Inc.
Ledeen Inc.
Westinghouse Air Brake Co., Industrial Products Div.

Mill

ABC Scale Div., The McDowell Co.
Allis-Chalmers Mfg. Co., Industries Group
Analytical Measurements, Inc.
Assoc. Electrical Industries Ltd.
Beckman Instruments, Inc., Scientific Instruments Div.
Bendix Aviation Corp.
Bristol Co., The
Euclid Electric & Mfg. Co.
Fischer & Porter Co.
Gardner, Ralph C. & Co.
Gebruder Hischmann Maschinenfabrik
General Electric Co., Apparatus Sales Div.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Infilco, Inc.
Leeds & Northrup Co.
Link-Belt Co.
MASSCO-ADAMS—see MINE & SMELTER SUPPLY CO.
MINE & SMELTER SUPPLY CO.
Norwood Controls Unit
Philadelphia Gear Works, Inc.
RAMSEY ENGINEERING CO.
Reliance Electric & Engineering Co.
Westinghouse Electric Corp.

Pneumatic

ABC Scale Div., The McDowell Co.
Bailey Meter Co.
Barber-Colman Co, Industrial Instruments Div.
Black, Sivalls & Bryson, Inc.
Bristol Co., The
Fielden Electronics Ltd.
Fischer & Porter Co.
Foxboro Co., The
GARDNER-DENVER CO.
Holman Bros. Ltd.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Infilco, Inc.
Ledeen, Inc.
Leeds & Northrup Co.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Westinghouse Air Brake Co., Industrial Products Div.

Pyrometallurgical

ABCs Scale Div., McDowell Co., Inc.
Allis-Chalmers Mfg. Co., Industries Group
Atkins Technical Inc.
Barber-Colman Co., Industrial Instruments Div.
Bristol Co., The
Foxboro Co., The
General Electric Co., Apparatus Sales Div.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Minneapolis-Honeywell Regulator Co., Industrial Div.

CONVERTERS

See Electrical Equipment; Pyrometallurgical Equipment; Transmissions

CONVEYOR EQUIPMENT

See also Scales

Belts

AMERICAN BRAKE SHOE CO.
American Biltrite Rubber Co., Boston Woven Hose & Rubber Div.
American Rubber Mfg. Co., The
AMSCO—see AMERICAN BRAKE SHOE CO.
Barber-Greene Co.
Bemis Bro. Bag Co.
Bonded Scale & Machine Co.
British Ropeway Engineering Co. Ltd.
Butler Mfg. Co.
Carlyle Rubber Co., Inc.
Carpco Mfg. Inc.
Chain Belt Co.
Continental Conveyor & Equip. Co.
Conveyor Co., The
Demag Aktiengesellschaft
DENVER EQUIPMENT CO.
EQUIPMENT ENGINEERS INC.
Gates Rubber Co.
Gebruder Hischmann Maschinenfabrik
GOODALL RUBBER CO.
Goodman Manufacturing Co., Diamond Iron Works Div.
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co.
Greening & Sons Ltd., N.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
HEWITT-ROBINS INC.
Howe Scale Co.
Iowa Manufacturing Co.
Jeffrey Mfg. Co., The
Kennedy-Van Saun Mfg. & Eng. Corp.
Lee Rubber & Tire Corp., Republic Rubber Div.
LINATEX CORP. OF AMERICA
Link-Belt Co.
Magnetic Engineering & Mfg. Co.
Mayo Tunnel & Mine Equipment
McNally Pittsburgh Mfg. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
National Mine Service Co.
Poor & Co., Pioneer Engineering Div.
Porter Co., H. K., Quaker Rubber Co. Div.
Raybestos-Manhattan, Inc.
Ray-man—see Raybestos-Manhattan Co.
Richardson Scale Co.
Rogers Iron Works Co.
Rost & Co., H.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Telluride Iron Wks.
Thor Power Tool Co.
Treadwell Co., Inc., M. H.
United States Rubber Co.
United States Steel Corp.
Universal Engineering Corp.

Buckets

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.
Barber-Greene Co.
Bonded Scale & Machine Co.
Butler Mfg. Co.
Carpco Mfg. Inc.
Chain Belt Co.
COLUMBIA STEEL CASTING CO., INC.
Continental Conveyor & Equip. Co.
Conveyor Co., The
DENVER EQUIPMENT CO.
EQUIPMENT ENGINEERING, INC.
Gebruder Hischmann Maschinenfabrik
GRUENDLER CRUSHER & PULVERIZER CO.
Harsco Corp., Taylor-Wharton Co. Div.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Koehring Co., Johnson Co., C. S., a subsid.
Link Belt Co.
Lippmann Engineering Works
Magnetic Engineering & Mfg. Co.
McDowell Co., Inc.
McNally Pittsburgh Mfg. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
NATIONAL IRON CO.
Poor & Co., Inc., Pioneer Engineering Div.
Rogers Iron Works Co.
Salem Tool Co.
Sanford-Day Iron Works, Inc.
Stephens-Adamson Mfg. Co.
Stubbe, Albert

Chain

American Brake Shoe Co.
Chain Belt Co.
Conveyor Co., The
Diamond Chain Co., Inc.
Dodge Manufacturing Corp.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Hack Engineering Co.
Harsco Corp., Taylor-Wharton Co. Div.
HEWITT-ROBINS
Irwin-Sensenich Corp.
Link-Belt Co.
Magnetic Engineering & Mfg. Co.
Stephens-Adamson Mfg. Co.

Drive and Tail Pulleys

ACF Industries, Inc., American Car & Foundry Div.
American Brake Shoe Co.
Barber-Greene Co.
Bonded Scale & Machine Co.
Chain Belt Co.
Continental Conveyor & Equip. Co.
Conveyor Co., The
Conveyor & Equip. Co.
Demag Aktiengesellschaft
Dodge Manufacturing Corp.
Equipment Engineers Inc.
Gebruder Hischmann Maschinenfabrik
General Electric Co.
Goodman Manufacturing Co.
GRUENDLER CRUSHER & PULVERIZER CO.
Hammermills Inc.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Manufacturing Co.
JOY MANUFACTURING CO.
Kloeckner-Humboldt-Deutz, AG
Link-Belt Co.
Lippmann Engineering Works
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Poor & Co. Inc., Pioneer Engineering Div.
Rogers Iron Works Co.
SKOOKUM CO., INC., THE
Smith Engineering Works
Stearns Magnetic Products
Stephens-Adamson Mfg. Co.
Telluride Iron Works Co.
TREADWELL CO., INC., M. H.
Universal Engineering Corp.
Washington Mach. Co.
Yuba Manufacturing Div.

Idlers

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
AMSCO—see AMERICAN BRAKE SHOE CO.
Barber-Greene Co.
Bonded Scale & Machine Co.
Chain Belt Co.
Continental Conveyor & Equip. Co.
Conveyor Co., The
EQUIPMENT ENGINEERING, INC.
Goodyear Tire & Rubber Co.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Eng. Co.
Haiss Mfg. Co., Inc., Geo.
Hammermills Inc.
Harsco Corp., Taylor-Wharton Co. Div.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
Kennedy-Van Saun Mfg. & Engr. Corp.

LIMBEROLLER—see JOY MANUFACTURING CO.
Link-Belt Co.
Lippmann Engineering Works, Inc.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO., THE MARCY MILL CO.
Pettibone Mulliken Corp.
Poor & Co., Inc., Pioneer Engineering Div.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Telluride Iron Works
TREADWELL CO., INC., M. H.
Universal Engineering Corp.

Pillow Blocks and Hangers

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Bonded Scale & Machine Co.
Chain Belt Co.
Continental Conveyor & Equipment Co.
Conveyor Co., The
Dodge Manufacturing Corp.
EQUIPMENT ENGINEERING, INC.
General Electric Co.
General Motors Corp., New Departure Div.
Graphite Metallizing Corp.
GRUENDLER CRUSHER & PULVERIZER CO.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
McNally Pittsburgh Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
S K F Industries, Inc.
Sealmaster—see Stephens-Adamson Mfg. Co.
SKOOKUM CO.
Stephens-Adamson Mfg. Co.
Telluride Iron Wks.
Universal Engineering Corp.

CONVEYORS AND ELEVATORS

See also Feeders

Belt

American Biltrite Rubber Co., Inc. Boston Woven Hose & Rubber Div.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
American M.A.N. Corp.
American Rubber Mfg. Co., The
Athey Products Corp.
Barber-Greene Co.
Bonded Scale and Machine Co.
British Ropeway Engineering Co. Ltd.
Butler Mfg. Co.
CALCOVEYOR—see FRANK J. MADISON COMPANY
Carlyle Rubber Co., Inc.
Carpco Mfg. Inc.
Chain Belt Co.
Continental Conveyor Equip. Co.
Conveyor Co., The
Demag Aktiengesellschaft
DENVER EQUIPMENT CO.
Eagle Crusher Co. Inc.
EQUIPMENT ENGINEERS INC.
Gebruder Hischmann Maschinenfabrik
GOODALL RUBBER CO.
Goodman Manufacturing Co.
Goodman Manufacturing Co., Diamond Iron Works Div.
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co., The
Greening & Sons Ltd., N.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
HEWITT-ROBINS
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co. Inc.
Howe Scale Co.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Manufacturing Co.
JOY MANUFACTURING CO.
Kennedy-Van Saun Mfg. & Eng. Co.
KLOECKNER-HUMBOLDT-DEUTZ AG—DETROIT DIESEL ENERGY CORP.
LAKE SHORE, INC.
Landis Steel Co.
Lee Rubber & Tire Corp., Republic Rubber Div.
LIMBEROPE—see JOY MFG. CO.
Link-Belt Co.
Lippmann Engineering Works, Inc.
M-H Standard Corp.
MADISON, FRANK J. COMPANY
Magnetic Engineering & Mfg. Co.
Mayo Tunnel & Mine Equip.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
MORSE BROS. MACHINERY CO.
NATIONAL IRON CO.
National Mine Service Co.
Oliver Corp., The A. B. Farquhar Div.
Pettibone Mulliken Corp.
Poor & Co., Pioneer Engineering Div.
Porter Co., Inc., H. K., Thermoid Div.
Raybestos-Manhattan, Inc.
READY-SPAN—see JOY MFG. CO.
Redi-Fab, see Barber-Greene Co.
Rex—see Chain Belt Co.
Richardson Scale Co.
Rogers Iron Works Co.
Rost & Co., H.
Sandvik Steel Inc.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
STURTEVANT MILL CO.
Telluride Iron Wks.
Thor Power Tool Co.
TREADWELL CO., INC., M. H.
United States Rubber Co.
United States Steel Corp.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Universal Road Machinery Co.
Washington Machinery Co.
WESTERN MACHINERY CO., WEMCO DIV.

Buckets

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
AMSCO—see AMERICAN BRAKE SHOE CO.
Barber-Greene Co.
Bonded Scale & Machine Co.
Butler Mfg. Co.
Carpco Mfg. Co.
Chain Belt Co.
COLUMBIA STEEL CASTING CO., INC.
Connellsville Corp.
Continental Conveyor & Equipment Co.
Conveyor Co., The
DENVER EQUIPMENT CO.
EQUIPMENT ENGINEERS INC.
Galigher Co.
Gebruder Hischmann Maschinenfabrik
Goodman Manufacturing Co., Diamond Iron Works Div.
Goodrich Industrial Products Co., B. F.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Iowa Manufacturing Co.
Irwin-Sensenich Corp.
Jeffrey Manufacturing Co., The
Kennedy-Van Saun Mfg. & Engr. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DETROIT DIESEL ENERGY CORP.
Koehring Co., Johnson Co., C. S.—a subsid.
LAKE SHORE, INC.
Landis Steel Co.
Link-Belt Co.
Lippmann Engineering Works Inc.
M-H Standard Corp.
Magnetic Engineering & Mfg. Co.
MCLANAHAN CORP.
McNally Pittsburgh Mfg. Corp.
NATIONAL IRON CO.
Oliver Corp., The, A. B. Farquhar Div.
Pettibone Mulliken Corp.
Poor & Co., Inc., Pioneer Engineering Div.
Richardson Scale Co.
Rogers Iron Works Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
STURTEVANT MILL CO.
Telluride Iron Wks.
TREADWELL CO., INC., M. H.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Universal Road Machinery Co.

Chain Conveyors

Bonded Scale & Machine Co.
Chain Belt Co.
Connellsville Corp.
Continental Conveyor & Equip. Co.
Conveyor Co., The
Diamond Chain Co., Inc.
Equipment Engineering Co.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Hack Engineering Co.
Harsco Corp., Taylor-Wharton Co. Div.
HEWITT-ROBINS
Hirsch Brothers Machinery Co.
Irwin-Sensenich Corp.
Jeffrey Mfg. Co., The
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Lippmann Engineering Works Inc.
M-H Standard Corp.
McNally Pittsburgh Mfg. Corp.
Mining Progress, Inc.
Morse Chain Co.
NATIONAL IRON CO.
Oliver Corp., The A. B. Farquhar Div.
Stephens-Adamson Mfg. Co.
Universal Dredge Mfg. Co.

Pneumatic

Cleveland Vibrator Co., The
Convair
Eriez Manufacturing Co.
Hirsch Brothers Machinery Co., Inc.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Spencer Turbine Co., The
U.S. Hoffman Machinery Corp.
Zimmerman Manufacturing Co.

Screw

AMSCO—see AMERICAN BRAKE SHOE CO.
Bonded Scale & Machine Co.
Butler Mfg. Co.
Carpco Mfg. Inc.
Central Mine Equipment Co.
Chain Belt Co.
COEUR D'ALENES CO., THE
Continental Conveyor & Equipment Co.
Conveyor Co., The
DENVER EQUIPMENT COMPANY
EQUIPMENT ENGINEERING CO.
Gebruder Hischmann Maschinenfabrik
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hirsch Brothers Machinery Co. Inc.
HOLO-FLITE—see WESTERN PRECIPITATION CO.
Jeffrey Manufacturing Co.
Kennedy-Van Saun Mfg. & Engr. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Koehring Co., Johnson Co., C. S.
Landis Steel Co.
Link-Belt Co.
Lippmann Engineering Works
M-H Standard Corp.
Mace Co., The
Magnetic Engineering & Mfg. Co.
McNally Pittsburgh Mfg. Corp.
Pettibone Mulliken Corp.
Poor & Co. Inc., Pioneer Engineering Div.
Richardson Scale Co.
Stephens-Adamson Mfg. Co.
STURTEVANT MILL CO.
Telluride Iron Wks.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Washington Machinery Co.
WESTERN PRECIPITATION CO.

Shaking or Vibrating

Bonded Scale & Machine Co.
Carpco Mfg. Inc.
Chain Belt Co.
Cleveland Vibrator Co., The
Dravo Corp.
Goodman Manufacturing Co.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Jeffrey Manufacturing Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Lippmann Engineering Works Inc.
Richardson Scale Co.
Scott Concentrators
Simplicity Engineering Co.
SMIDTH & CO., F. L.
Stephens-Adamson Mfg. Co.
Syntron Co.
Telluride Iron Wks.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
VULCAN IRON WKS., INC.

Steel Plate

Benoto Inc.
Bonded Scale & Machine Co.
Cleveland Vibrator Co., The
Connellsville Corp.
Gebruder Hischmann Maschinenfabrik
General Electric Co.
Hack Engineering Co.
Hammermills Inc.
Harsco Corp., Taylor-Wharton Co. Div.
Hirsch Brothers Machinery Co., Inc.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works Inc.
Rogers Iron Works

COOLERS

See also Dryers & Kilns

ACEC
Allis-Chalmers Mfg. Co.
Amsco—see American Brake Shoe Co.
Assoc. Electrical Industries Ltd.
Braun & Co., C. F.
Buttner Works Inc.
Carrier Conveyor Corp.
Carrier Corp.
Dravo Corp.
Gebruder Hischmann Maschinenfabrik
Gould & Co., Gordon I.
HARDINGE CO., INC. (ROTARY)
Jeffrey Manufacturing Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Nichols Engineering & Research Corp.
NORDBERG MFG. CO.
F. L. SMIDTH & CO.
SOUTHWESTERN ENGINEERING CO.
STANDARD STEEL CORP.
Stearns-Roger Mfg. Co., The
Traylor Engr. & Mfg. Co. Div., Fuller Co.
Washington Machinery Co.
WESTERN PRECIPITATION CORP.
Windeler Co., Ltd., George

COOLERS, MINE

ACEC
Carrier Corp.

COOLING TOWERS

See also Dryers & Kilns

American Standard Corp., American Blower Corp. Div.
Bethlehem Steel Co.
Carrier Corp.
Foster Wheeler Corp.
Hirsch Brothers Machinery Co., Inc.
Mannesmann-Export GmbH
National Tank & Pipe Co.
Windeler Co., Ltd., George

CORE BARRELS

ACKER DRILL CO., INC.
American Coldset Corp.
BOYLES BROS. DRILLING
CHICAGO PNEUMATIC TOOL CO.
Christensen Diamond Products Co.
DIAMOND DRILL CONTRACTING CO.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., George E.
HUGHES TOOL CO.
JOY MANUFACTURING CO.
LONGYEAR CO., E. J.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
SPRAGUE & HENWOOD, INC.
Wheel Trueing Tool Co.

COPYING EQUIPMENT

Blueprint Machines

Dietzgen Co., Eugene
Four Wheel Drive Corp.

Business Photocopy Machines

Dietzgen Co., Eugene
General Aniline & Film Corp., Ozalid Div.

Whiteprint Machines

Dietzgen Co., Eugene
General Aniline & Film Corp., Ozalid Div.
Rotolite Sales Corp.

COUNTERS, GEIGER, OR SCINTILLATION

See Geiger Scintillation Counters

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

COUPLERS, CAR

Bethlehem Steel Co.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Differential Steel Car Co.
Eimco Corp., The
Hudson Ltd., Robert
Irwin-Sensenich Corp.
Mayo Tunnel & Mine Equipment
Miners Foundry & Mfg. Co.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Ohio Brass Co.
Sanford-Day Iron Works Inc.
Utility Mine Equipment Co.
WILLISON—see NATIONAL MALLEABLE & STEEL CASTINGS CO.

COUPLINGS

See also Transmissions

Hose

AB Alvenius Industrier
American Rubber Mfg. Co., The
ATLAS COPCO INC.
Band-It Co.
CHICAGO PNEUMATIC TOOL CO.
Cleveland Div., Westinghouse Air Brake Co.
Gates Rubber Co.
GOODALL RUBBER CO.
Goodrich Industrial Products Co., B. F.
HEWITT-ROBINS
Holman Bros. Ltd.
Hose Accessories Co.
INGERSOLL-RAND CO.
Lee Rubber & Tire Corp., Republic Rubber Div.
Lincoln Engineering Co. Div., McNeil Machine & Engr. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Snap-Tite, Inc.
Stewart-Warner Corp., Alemite Div.
Stratoflex, Inc.
Thor Power Tool Co.
United States Rubber Co.
Victaulic Corp. of America

Pipe

AB Alvenius Industrier
ATLAS COPCO INC.
Band-It Co.
Bethlehem Steel Co.
Colonial Plastics Mfg. Co., The Industrial Div.
Eastern Malleable Iron Co., Eastern Sales Co. Div.
ESCO International
FOOD MACHINERY & CHEM. CORP., JOHN BEAN DIV.
GOODALL RUBBER CO.
Grinnell Co., Inc.
Gustin-Bacon Mfg. Co.
Industrial Coupler Co.
JOHNS-MANVILLE SALES CORP.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
National Supply Co. (Pa.)
PACIFIC PIPE CO.
H. K. Porter Co., Inc., Forge & Fittings Div.
Snap-Tite, Inc.
Stratoflex, Inc.
Thor Power Tool Co.
United States Rubber Co.
Victaulic Co. of America
Walworth Co.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Youngstown Sheet & Tube Co.

Shaft & Shaft Flexible

Brown, Inc., David
Chain Belt Co.
Diamond Chain Co., Inc.
Dodge Manufacturing Corp.
Falk Corp., The
HEWITT-ROBINS
Jeffrey Mfg. Co.
KOPPERS CO., INC., METAL PRODS. DIV.
Link-Belt Co.
Morse Chain Co.
Philadelphia Gear Wks., Inc.
Thomas Flexible Coupling Co.
Twin Disc Clutch Co.
Western Gear Corp.

CRANES

Bridge

Alliance Machine Co.
Allison Steel Mfg. Co.
American Chain & Cable Co. Inc., American Chain Div.
American Chain & Cable Co. Inc., Wright Hoist Div.
American Hoist & Derrick Co.
American M.A.N. Corp.
Benoto Inc.
Demag Aktiengesellschaft
Dravo Corp.
Hack Engineering Co.
HARNISCHFEGER CORP.
Heyl & Patterson, Inc.
John Deere Industrial Div.
Kaiser Steel Corp.
MARION POWER SHOVEL CO.
McDowell Co., Inc.
Ohio Hoist & Mfg. Co.
Pitman Manufacturing Co.
Robbins & Myers, Inc.
Shepard Niles Crane & Hoist Corp.
Stearns-Roger Mfg. Co.
United States Steel Corp.
Universal Dredge Mfg. Co.
Wellman Engineering Co., The
Yuba Consolidated Industries, Inc.

Jib

ALIMAK CORPORATION
American Chain & Cable Co., Inc., American Chain Div.
American Chain & Cable Co., Inc., Wright Hoist Div.
American Hoist & Derrick Co., Crosby-Laughlin Div.
American M.A.N. Corp.
Austin-Western & Lima A. W.
BALDWIN-LIMA-HAMILTON CORP.
Clyde Iron Works, Inc.
Hack Engineering Co.
HARNISCHFEGER CORP.
Le Tourneau-Westinghouse Co.
MARION POWER SHOVEL CO.
Ohio Hoist & Mfg. Co.
Robbins & Myers, Inc.
Shepard Niles Crane & Hoist Corp.
Smith & Sons (Rodley) Ltd., Thomas
Universal Dredge Mfg. Co.

Truck or Tractor Mounted

Allis-Chalmers Mfg. Co., Const. Machy. Div.
American Hoist & Derrick Co.
American M.A.N. Corp.
BALDWIN-LIMA-HAMILTON CORP.
Blackhawk Industrial Div.
Bay City Shovels Inc.
Bucyrus-Erie Co.
Clark Equip. Co., Const. Mach. Div.
Clyde Iron Works, Inc.
Demag Aktiengesellschaft
Dratt Manufacturing Corp.
Four Wheel Drive Auto Co., The
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Hiab—see Stanco Mfg. & Sales, Inc.
Hyster Co.
International Harvester Co.
Koehring Co.
Le Tourneau-Westinghouse Erie Co.
Link-Belt Speeder Corp.
LIMA—see BALDWIN-LIMA-HAMILTON CORP.
Lorain—see Thew Shovel Co.
Manitowoc Engineering Corp.
MARION POWER SHOVEL CO.
Michigan—see Clark Equipment Co.
Northwest Engineering Co.
Ohio Hoist & Mfg. Co.
Pettibone-Mulliken Corp.
Pitman Manufacturing Co.
Quick Way Truck Shovel Co.
Schield Bantam Co. Inc.
Shepard Niles Crane & Hoist Corp.
Smith & Sons (Rodley) Ltd., Thomas
Stanco Mfgs. & Sales Inc.
Thew Shovel Co., Inc.
Transit Crane—see Bucyrus-Erie Co.
Tournapull—see Le Tourneau-Westinghouse Co.
Uhrden, Inc.
Unit Crane & Shovel Corp.
Washington Iron Works

CRUSHERS

See also Laboratory Equipment and Supplies; Pulverizers

Cone

Allis-Chalmers Mfg. Co., Industries Group
Amsco—see American Brake Shoe Co.
Bath Iron Works Corp., Pennsylvania Crusher Div.
Buttner Works Inc.
COEUR D'ALENES CO., THE
ESCO Corp.
General Electric Co.
Hammermills Inc.
Hydrocone—see Allis-Chalmers Mfg. Co.
Kenco
Kennedy-Van Saun Mfg. & Eng. Corp.
Lippmann Engineering Works, Inc.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
NORDBERG MFG. CO.
Reynolds-French & Co.
Smith Engineering Works
Straub Mfg. Co.
STURTEVANT MILL CO.
SYMONS—see NORDBERG MANUFACTURING CO.
Universal Engineering Corp.

Disk

ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Reynolds-French & Co.

Gyratory

Allis-Chalmers Mfg. Co., Industries Group
AMSCO—see AMERICAN BRAKE SHOE CO.
Bath Iron Works Corp., Pennsylvania Crusher Co.
Buttner Works Inc.
ESCO Corp.
Kennedy-Van Saun Mfg. & Eng. Corp.
Kue-ken—see Straub Mfg. Co., Inc.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Lippmann Engineering Works
MINE & SMELTER SUPPLY CO.
NORDBERG MFG. CO.
Nubergs Mek. Verkstad, Edvard
Reynolds-French & Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
STURTEVANT MILL CO.
Superior—see Allis-Chalmers Mfg. Co.
SYMONS—see NORDBERG MFG. CO.
Traylor Engr. & Mfg. Co., Div. Fuller Co.

Hammer and Impact

Allis-Chalmers Mfg. Co., Industries Group
AMSCO—see AMERICAN BRAKE SHOE CO.
Athey Prod. Corp.
Bath Iron Works Corp., Pennsylvania Crusher Div.
Baxter, Ltd.
Buttner Works Inc.
Combustion Engineering, Inc., Raymond Div.
Eagle Crusher Co. Inc.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Hammermills, Inc.
Hazemag USA Inc.
Hirsch Brothers Machinery Co., Inc.
Iowa Manufacturing Co.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Knittel—see Stephens-Adamson Mfg. Co.
Lippmann Engineering Works Inc.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
NORDBERG MFG. CO.
Pettibone-Mulliken Corp.
Pioneer Geochemical Surveys Inc.
Poor & Co., Inc., Pioneer Eng. Div.
Pulva Corp.
Pulverator Co.—see Allis Chalmers Mfg. Co.
Reynolds-French & Co.
Rogers Iron Works Co.
Simplicity Engineering Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
STURTEVANT MILL CO.
SYMONS—see NORDBERG MFG. CO.
Universal Engineering Corp.
Williams Patent Crusher & Pulverizer Co.

Jaw

A-1—see Allis-Chalmers Mfg. Co.
Allis-Chalmers Mfg. Co., Industries Group
ALLOY STEEL & METALS CO.
AMSCO—see AMERICAN BRAKE SHOE CO.
BALDWIN-LIMA-HAMILTON CORP.
Bath Iron Works Corp., Pennsylvania Crusher Div.
Bico, Inc.
Birdsboro Corp.
Bonded Scale & Machine Co.
Buttner Works Inc.
DENVER EQUIPMENT CO.
Eagle Crusher Co., Inc.
ESCO Corp.
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Hammermills Inc.
Iowa Manufacturing Co.
Jeffrey Mfg. Co.
Kenco
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Lippmann Engineering Works Inc.
Live Roller Mills Mfg. Co.
MADSEN—see BALDWIN-LIMA-HAMILTON CORP.
MASSCO—see MINE & SMELTER SUPPLY CO.
MCLANAHAN CORP.
MINE & SMELTER SUPPLY CO.
Morgardshammars Mek. Verkstads AB
MORSE BROS. MACHINERY CO.
NORDBERG MFG. CO.
PACIFIC—see ALLOY STEEL & METALS CO.
Pettibone-Mulliken Corp.
Poor & Co., Inc., Pioneer Engr. Div.
Reynolds-French & Co.
Rogers Iron Works Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Straub Mfg. Co., Inc.
STURTEVANT MILL CO.
SYMONS—see NORDBERG MFG. CO.
Texas Gulf Sulphur Co.
Traylor Engineering & Mfg. Co., Div. Fuller Co.
Universal Engineering Corp.
Universal Road Machinery Co.

Roll

ACF Industries, Inc., American Car & Foundry Div.
Allis-Chalmers Mfg. Co., Industries Group
Austin-Western—see Baldwin-Lima-Hamilton Corp.
BALDWIN-LIMA-HAMILTON CORP.
Bath Iron Works Corp., Pennsylvania Crusher Div.
Birdsboro Corp.
Bonded Scale & Machine Co.
Buttner Works Inc.
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
Eagle Crusher Co. Inc.
ESCO Corp.
Exolon Co., The
Fairmont—see Allis-Chalmers Mfg. Co.
Gebruder Hischmann Maschinenfabrik
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Gundlach Machine Co., T. J.
Hammermills Inc.
Iowa Manufacturing Co.
Jeffrey Mfg. Co.
Kenco
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Lippmann Engineering Works Inc.
Live Roller Mills Mfg. Co.
MCLANAHAN CORP.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
MORSE BROS. MACHINERY CO.
Osborne Lab., Inc., Raymond G.
Pettibone-Mulliken Corp.
Poor & Co., Inc., Pioneer Engr. Div.
Pulva Corp.
Reynolds-French & Co.
Rogers Iron Works Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
STURTEVANT MILL CO.
Traylor Engineering & Mfg. Co., Div. Fuller Co.
Union Iron Works Co.
Universal Engineering Corp.
Williams Patent Crusher & Pulverizer Co.

CRUSHER PARTS

(Other than primary crusher manufacturers above)

Jaws & Cheek Plates

ALLOY STEEL & METALS CO.
American Brake Shoe Co.
Birdsboro Corp.
COLUMBIA STEEL CASTING CO. INC.
ESCO Corp.
Hammermills Inc.
Harsco Corp., Taylor-Wharton Co., Div.
Kennedy-Van Saun Mfg. & Eng. Corp.

NATIONAL MALLEABLE & STEEL CASTINGS CORP.
Pettibone-Mulliken Corp.
Washington Iron Works

CYCLONES

See also Classifiers
Allison Steel Mfg. Co.
American Air Filter Co., Inc.
Buell Engineering Co., Inc.
CENTRCLONE—see DORR-OLIVER, INC.
Centrifugal & Mechanical Industries, Inc.
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
DORRCLONES—see DORR-OLIVER INC.
Ducon Co.
EQUIPMENT ENGINEERS INC.
Gebruder Hischmann Maschinenfabrik
GRUENDLER CRUSHER & PULVERIZER CO.
HARDINGE CO., INC.
Hazemag USA Inc.
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co., The
Hydraulic Supply Mfg. Co.
Johnson March Corp.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LINATEX CORP. OF AMERICA
Liquid-Solid Separations Ltd.
LURGI GmbH
McNally Pittsburgh Mfg. Corp.
Northern Blower Co.
PETERSON FILTERS & ENGINEERING CO.
Smith Engineering Works
STANDARD STEEL CORP.
Telluride Iron Works Co.
WESTERN MACHINERY CO., WEMCO DIV.
Williams Patent Crusher & Pulverizer Co.

CYLINDERS AND ACTUATORS

Bethlehem Steel Co.
Commercial Shearing & Stamping Co.
English Electric Co. Ltd.
Walter Kidde & Co., Inc.
Ledeen Inc.
McDowell Co., Inc.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Wellman Engineering Co., The
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Industrial Products Div.

DIAMOND BIT RESETTING

ACKER DRILL CO., INC.
American Coldset Corp.
Christensen Diamond Products Co.
DIAMOND DRILL CONTRACTING CO.
DIAMOND TOOL RESEARCH CO. INC.
Drilling Accessory & Mfg. Co. Inc.
Havlick, J. L.
Hoffman—see Stanco
JOY MANUFACTURING CO.
McCLINTOCK CO., R. S.
Mobile Drilling, Inc.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Smit & Co., Inc., Anton
J. K. Smit & Sons, Inc.
Stanco Mfgs. & Sales, Inc.
VAREL MANUFACTURING CO.
Wheel Trueing Tool Co.

DIAMOND DRILL EQUIPMENT

See also Bits; Drills, Rock
ACKER DRILL CO., INC.
American Coldset Corp.
BOYLES BROS. DRILLING CO.
BOYLES BROS. DRILLING CO., LTD., (Canada)
CHICAGO PNEUMATIC TOOL CO.
Christensen Diamond Products Co.
DIAMOND DRILL CONTRACTING CO.
Drilling Accessory & Mfg. Co. Inc.
Failing Co., George E.
GARDNER-DENVER CO.
JOY MANUFACTURING CO.
LONGYEAR CO., E. J.
McCLINTOCK CO. R. S.
Mobile Drilling, Inc.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Smit & Co. Inc., Anton
SPRAGUE & HENWOOD, INC.
Tomco Products Co.
VAREL MFG. CO.
Wheel Trueing Tool Co.
Winter-Weiss Co., The

DIAMOND DRILLING

See Exploration Services

DIAMOND DRILLS

See Drills, Rock

DIAMONDS, INDUSTRIAL

See also Diamond Bit Resetting Service
ACKER DRILL CO., INC.
American Coldset Corp.
Christensen Diamond Products Co.
DIAMOND TOOL RESEARCH CO., INC.
Drilling Accessory & Mfg. Co. Inc.
General Electric Co., Metallurgical Products Dept.
Koebel Diamond Tool Co.
LONGYEAR, E. J. CO.
MCCLINTOCK CO. R. S.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Smit & Co., Inc., Anton
J. K. Smit & Sons, Inc.
SPRAGUE & HENWOOD, INC.
VAREL DIAMOND PRODUCTS CO.
Wheel Trueing Tool Co.

DIPPERS

See Buckets

DOORS, MINE

AMERICAN MINE DOOR CO.
CANTON—see AMERICAN MINE DOOR CO.
COEUR D'ALENES CO., THE
Hirsch Brothers Machinery Co. Inc.
Hudson Ltd., Robert
MACHINERY CENTER INC.
National Mine Service Co.

DRAFTING SUPPLIES

See Engineering Supplies and Drafting Equipment

DRAGLINES

See Excavators

DREDGES AND DREDGE BUCKETS

Connected Bucketline

American Brake Shoe Co.
COLUMBIA STEEL CASTING CO., INC.
Dravo Corp.
ELLICOTT MACHINE CORP.
Hack Engineering Co.
Hirsch Brothers Machinery Co. Inc.
McDowell Co., Inc.
Morris Machine Works
Universal Dredge Mfg. Co.
Washington Iron Works
Wellman Eng. Co., Williams Bucket Div.
Yuba Consolidated Industries Inc.

Cutterhead (Hydraulic)

See also Monitors
American Brake Shoe Co.
American Hoist & Derrick Co., Crosby-Laughlin Div.
American Steel Dredge Co., Inc.
Eagle Iron Works
ESCO Corp.
ELLICOTT MACHINE CORP.
Hack Engineering Co.
Morris Machine Works
Universal Dredge Mfg. Co.
Yuba Consolidated Industries Inc.

Dragline Dredge

AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
American Hoist & Derrick Co.
Hack Engineering Co.
Hirsch Brothers Machinery Co. Inc.
McDowell Co., Inc.
Page Engineering Co.
Universal Dredge Mfg. Co.
Washington Iron Works
Westfalische Union AG
Yuba Consolidated Industries Inc.

Suction

American Brake Shoe Co.
Eagle Iron Works
ELLICOTT MACHINE CORP.
Hack Engineering Co.
Morris Machine Works
Universal Dredge Mfg. Co.
Yuba Consolidated Industries Inc.

DRIFTERS

See Drills, Rock

DRILLING CONTRACTORS

See Exploration Services

DRILL SHARPENERS

See Sharpeners, Rock Bit and Steel

DRILL STEEL

See Steel

DRILLS, ROCK

See also Diamond Drill Equipment

Alluvial Prospecting

Bucyrus-Erie Co.
Mobile Drilling, Inc.

Auger Drills

ACKER DRILL COMPANY, INC.
ATLAS COPCO INC.
Bucyrus-Erie Co.
Cardox Corp., Hardsoeg Div.
Central Mine Equipment Co.
CHICAGO PNEUMATIC TOOL CO.
DIAMOND DRILL CONTRACTING CO.
Failing Co., Geo. E.
Firth Sterling, Inc.
GARDNER-DENVER CO.
General Electric Co., Metallurgical Prods. Dept.
General Equipment Co.
JOY MANUFACTURING CO.
Koehring Co.
Koehring Co., Kwik Mix Co. Div.
LONGYEAR, E. J. CO.
Mayhew Machine & Supply Co.
Mobile Drilling, Inc.
Pennsylvania Drilling Co., Penndrill Mfg. Co.
Rogers Iron Works Co.
Salem Tool Co., The
Thor Power Tool Co.
Vascoloy-Ramet Corp.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Worthington Corp.

Burn-Cut Drills

Ingersoll-Rand Co.
JOY MANUFACTURING CO.
Koehring Co., Kwik Mix Co. Div.

Churn Drills

Bucyrus-Erie Co.
GARDNER-DENVER CO.
General Electric Co., Metallurgical Prods. Dept.
Hossfeld Mfg. Co., Rock Drill Div.
Koehring Co.
LONGYEAR CO., E. J.
Mobile Drilling Inc.
SPANG & CO.

Crawler-Mounted Drills

ALIMAK CORP.
ATLAS COPCO INC.
Bucyrus-Erie Co.
CHICAGO PNEUMATIC TOOL CO.
Davey Compressor Co.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., Geo. E.
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
MACHINERY CENTER CO.
Mayhew Machine & Supply Co.
Mobile Drilling, Inc.
Reichdrill Div., Chicago Pneumatic Tool Co.
Rogers Iron Works Co.
Salem Tool Co.
SCHRAMM INC.
Thor Power Tool Co.
TRACDRILL—see JOY MFG. CO.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.
Winter-Weiss Co., The

Diamond Drills

ACKER DRILL CO., INC.
American Coldset Corp.
Bico Inc.
BOYLES BROS. DRILLING CO.
BOYLES BROS. DRILLING CO., LTD. (Canada)
Bucyrus-Erie Co.
CHICAGO PNEUMATIC TOOL CO.
DIAMOND DRILL CONTRACTING CO.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., Geo. E.
General Electric Co., Metallurgical Prods. Dept.
Havlick, J. L.
Hitchcock Mfg. Co.
Hitchcock, Leo L.
JOY MANUFACTURING CO.
Koebel Diamond Tool Co.
LONGYEAR CO., E. J.
MCCLINTOCK CO. R. S.
Mobile Drilling Inc.
Monarch Equipment Co.
Morgardshammars Mek. Verkstads AB
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Port-O-Power—see Hitchcock Mfg. Co., Leo
Smit & Co. Inc., Anton
J. K. Smit & Sons, Inc.
SPRAGUE & HENWOOD, INC.
Stanco Mfgs. & Sales, Inc.
SUPER PIONEER—see DIAMOND DRILL CONTRACTING CO.
Tomco
VAREL MFG. CO.
Wheel Trueing Tool Co.
WINK CORP., F. W.
Winter-Weiss Co., The

Down-the-Hole

Brunner & Lay, Inc.
CHICAGO PNEUMATIC TOOL CO.
Failing Co., Geo. E.
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Koehring Co.
Le Roi Div., Westinghouse Air Brake Co.
MACHINERY CENTER, INC.
Mission Manufacturing Co.
Mobile Drilling, Inc.
Reichdrill Div., Chicago Pneumatic Tool Co.
Rogers Iron Works Co.
SCHRAMM INC.
THOR POWER TOOL CO.
Westinghouse Air Brake Co., Le Roi Div.
Winter-Weiss Co., The

Drifters

ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Demag Aktiengesellschaft
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
LAKE SHORE INC.
Le Roi Div., Westinghouse Air Brake Co.
SCHRAMM INC.
SILVER STREAK—see JOY MFG. CO.
Thor Power Tool Co.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.
Worthington Corp.

Gasoline Drills and Hammers

ACKER DRILL CO.
ATLAS COPCO INC.
Barco Mfg. Co.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Carpo Mfg. Co.
CHICAGO PNEUMATIC TOOL CO.
Drilling Accessory & Mfg. Co. Inc.
General Equipment Co.
Hossfeld Mfg. Co., Rock Drill Div.
Pionjar—see Stanco Mfg. & Sales, Inc.
STANCO MFG. & SALES, INC.
Syntron Co.

Jet Piercing Drills

Bucyrus-Erie Co.
Carpco Mfg. Inc.
Union Carbon & Carbide Corp., Linde Air Products Co., Div.

Jumbos and Boom Assemblies

See also Self Loading Transport
ALIMAK CORP.
ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
GARDNER-DENVER CO.
HYDRO DRILL JIB—see JOY MFG. CO.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Landis Steel Co.
MACHINERY CENTER, INC.
Mayo Tunnel & Mine Equipment
Mobile Drilling Inc.
Rogers Iron Works Co.
Sanford-Day Iron Works
Shaft & Development Machines, Inc.
Thor Power Tool Co.
Transloader—see Sanford-Day Iron Works Inc.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.
Winter-Weiss Co., The

Rotary Drills

ACKER DRILL CO., INC.
Bedford & Sons Ltd., John
Bucyrus-Erie Co.
Cardox Corp.
Central Mine Equipment Co.
CHAMPION—see JOY MFG. CO.
CHICAGO PNEUMATIC TOOL CO.
Davey Compressor Co.
Demag Aktiengesellschaft
Drilling Accessory Mfg. Co., Inc.
Failing Co., Geo. E.
Firth Sterling, Inc.
GARDNER-DENVER CO.
General Electric Co., Metallurgical Prods. Dept.
Hitchcock Mfg. Co., Leo
HOLMAN BROS. LTD.
Failing Co., Geo. E.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Koehring Co.
Le Roi Div., Westinghouse Air Brake Co.
LONGYEAR CO., E. J.
Mayhew Machine & Supply Co.
Mobile Drilling Inc.
National Supply Co. (Pa.)
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Reichdrill Div., Chicago Pneumatic Tool Co.
Rogers Iron Works Co.
SCHRAMM INC.
Smit & Co., Inc., Anton
SPRAGUE & HENWOOD, INC.
Star Expansion Pacific, Inc.
Thor Power Tool Co.
VAREL MFG. CO.
Vascoloy-Ramet Corp.
Westinghouse Air Brake Co. (Pa.)
Westinghouse Air Brake Co., Le Roi Div.
Winter-Weiss Co., The

Rotary, Percussive

ATLAS COPCO INC.
Bedford & Sons Ltd., John
Benoto Inc.
CHICAGO PNEUMATIC TOOL CO.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., Geo. E.
GARDNER-DENVER CO.
General Electric Co., Metallurgical Prods. Dept.
Hitchcock Mfg. Co., Leo
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Koehring Co.
Mobile Drilling Inc.
Reichdrill Div., Chicago Pneumatic Tool Co.
SCHRAMM INC.
Smit & Co., Inc., Anton
Textron Inc., Homelite Div.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.
Winter-Weiss Co., The

Shaft Sinking Rotary

CHICAGO PNEUMATIC TOOL CO.
Drilling Accessory & Mfg. Co. Inc.
LAKE SHORE INC.
Rogers Iron Works Co.
Winter-Weiss Co., The

Shot Drills

ACKER DRILL CO., INC.
Cardox Corp.
CHICAGO PNEUMATIC TOOL CO.
Davey Compressor Co.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., Geo. E.
GARDNER-DENVER CO.
Mayhew Machine & Supply Co.
Mobile Drilling, Inc.
Pennsylvania Drilling Co., Penndrill Div.
SPRAGUE & HENWOOD, INC.
Westinghouse Air Brake Co. (Pa.)
Winter-Weiss Co., The

Sinkers

ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Davey Compressor Co.
Demag Aktiengesellschaft
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Le Roi Div., Westinghouse Air Brake Co.
SCHRAMM INC.
SILVER STREAK—see JOY MFG. CO.
SPANG & CO.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.

Stopers

ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Demag Aktiengesellschaft
GARDNER-DENVER CO.
Holman Bros. Ltd.
Ingersoll-Rand Co.
JOY MANUFACTURING CO.
THOR POWER TOOL CO.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.

Truck-Mounted

ACKER DRILL CO., INC.
Benoto, Inc.
BLAST AIR—JOY MFG. CO.
BOYLES BROS. DRILLING CO. LTD. (CANADA)
Bucyrus-Erie Co.
CHICAGO PNEUMATIC TOOL CO.
Davey Compressor Co.
Drilling Accessory & Mfg. Co., Inc.
Failing Co., Geo. E.
Four Wheel Drive Auto Co., The
GARDNER-DENVER CO.
HOUSTON TOOL CO.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Koehring Co.
LONGYEAR CO., E. J.
MACHINERY CENTER INC.
Mayhew Machine & Supply Co.
Mobile Drilling Inc.
National Supply Co. (Pa.)
Reichdrill Div., Chicago Pneumatic Tool Co.
SCHRAMM, INC.
SPRAGUE & HENWOOD, INC.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.
Westinghouse Air Brake Co. (Pa.)
Willys Motors, Inc.
Winter-Weiss Co., The

Vacuum

HOUSTON TOOL CO.

Wagon Drills

ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Demag Aktiengesellschaft
Drilling Accessory & Mfg. Co., Inc.
Firth Sterling Inc.
GARDNER-DENVER CO.
Holman Bros. Ltd.
Hossfeld Manufacturing Co.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Le Roi Div., Westinghouse Air Brake Co.
MACHINERY CENTER INC.
SCHRAMM, INC.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.
Worthington Corp.

DRIVES

See also Shaft-Mounted Drives, Speed Changers, Drive Gear

Chain

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Bonded Scale & Machine Co.
Chain Belt Co.
Conveyor Co., The
Dodge Manufacturing Corp.
Goodrich Co., B. F., Industrial Prod.
HEWITT-ROBINS
Hirsch Brothers Machinery Co. Inc.
Iowa Mfg. Co.
Jeffrey Manufacturing Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Morse Chain Co.
NATIONAL IRON CO.
National Supply Co. (Penna.)
Stephens-Adamson Mfg. Co.
United States Rubber Co.

Flatbelt

American Rubber Mfg. Co.
Conveyor Co., The
Gates Rubber Co., The
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co.
Hazemag U.S.A., Inc.
HEWITT-ROBINS
Hirsch Brothers Machinery Co. Inc.
Iowa Mfg. Co.
Link-Belt Co.
NATIONAL IRON CO.
National Supply Co. (Penna.)
United States Rubber Co.
Western Gear Works

Fluid

American Chain & Cable Co., Inc., Wright Hoist Div.
American Standard Corp., American Blower Corp., Div.
Conveyor Co., The
Dodge Manufacturing Corp.
Hirsch Brothers Machinery Co. Inc.
Link-Belt Co.
Rockwell Manufacturing Co.
Twin Disc Clutch Co.

Variable Speed

Allis-Chalmers Mfg. Co.
Louis Allis Co.
American Chain & Cable Co., Inc., Wright Hoist Div.
American Standard Corp., American Blower Corp., Div.
Conveyor Co., The
Dodge Manufacturing Corp.
Eaton Manufacturing Co., Dynamite Div.
Eaton Manufacturing Co., Cleveland Worm & Gear Div.
Electric Machinery Mfg. Co.
English Electric Co. Ltd.
Gates Rubber Co., The
General Dynamics Corp., Electro Dynamic Div.
General Electric Co., Apparatus Sales Div.
Hathaway Instruments, Inc.—Sterling Electric Motors, Inc.
HEWITT-ROBINS INC.
Hirsch Brothers Machinery Co., Inc.
Leeds & Northrup Co.
Link-Belt Co.
Morse Chain Co.
Reliance Electric and Engineering Co.
Stephens-Adamson Mfg. Co.
Twin Disc Clutch Co.
U. S. Electrical Motors, Inc.
Western Gear Corp. (Calif.)

V-Belt

Allis-Chalmers Mfg. Co., Industries Group
Louis Allis Co., The
Bonded Scale & Machine Co.
Conveyor Co., The
Dodge Manufacturing Co.
Gates Rubber Co., The
Goodrich Co., B. F., Industrial Products Div.
Goodyear Tire & Rubber Co.
Hazemag U.S.A., Inc.
HEWITT-ROBINS INC.
Hirsch Brothers Machinery Co.
Iowa Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Magic Grip—see Allis-Chalmers Mfg. Co.
NATIONAL IRON CO.
National Supply Co. (Penna.)
Stephens-Adamson Mfg. Co.
Taper-Lock—see Dodge Mfg. Co.
United States Rubber Co.
Western Gear Works
Worthington Corp.

DRIVES, GEAR

See Gears

DRYERS AND KILNS

See also Sintering Machines; Coolers
Allis-Chalmers Mfg. Co., Industries Group
Allison Steel Mfg. Co.
American Locomotive Co.
Barber-Greene Co.
Basic Products Corp., Hevi-Duty Electric Co. Div.
Bethlehem Steel Co.
Bird Machine Co.
Booth Co., Inc., The
Buttner Works Inc.
Carpco Mfg. Inc.
Carrier Conveyor Corp.
Centrifugal & Mechanical Industries, Inc. (C-M-I)
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
Denver Fire Clay Co., The
DORR-OLIVER INC.
Dravo Corp.
Eimco Corp.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
General Machinery Co.
Gould & Co., Gordon I.
Hack Engineering Co.
HARDINGE CO., INC. (ROTARY)
Hazemag USA Inc.
Hirsch Brothers Machinery Co., Inc.
Heyl & Patterson, Inc.
HOLO-FLITE—see WESTERN PRECIPITATION CORP.
Infilco, Inc.
Iowa Manufacturing Co.
Kaiser Steel Corp.
Kennedy-Van Saun Mfg. & Eng. Corp.
Kloeckner-Humboldt-Deutz AG—Diesel Energy Corp.
Link-Belt Co.
Loesche Hartzerkleinerungs-u. Zementmaschinen K.G.
LURGI GmbH
Mace Co., The
MCLANAHAN CORP.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO.
Nichols Engineering & Research Corp.
NORDBERG MFG. CO.
Pacific Foundry & Metallurgy Co.
SKINNER—see MINE & SMELTER SUPPLY CO.
F. L. SMIDTH & CO.
STANDARD STEEL CORP.
Stearns-Roger Mfg. Co., The
Telluride Iron Wks.
Traylor Eng. & Mfg. Co., Div. Fuller Co.
Universal Dredge Mfg. Co.
Washington Machinery Co.
WESTERN MACHINERY CO., WEMCO DIV.
WESTERN PRECIPITATION CORP.

DUMPERS, MINE CAR

Allison Steel Mfg. Co.
ATLAS COPCO INC.
Bethlehem Steel Co.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Connellsville Corp.
Differential Steel Car Co.
GARDNER-DENVER CO.
GETMAN BROS. MFG. DIVSN.
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co., Inc.
Hudson Ltd., Robert
Irwin-Sensenich Corp.
Koehring Co.
LAKE SHORE INC.
Link-Belt Co.
Mayo Tunnel & Mine Equipment
McDowell Co., Inc.
McNally Pittsburgh Mfg. Corp.
Miners Foundry & Mfg. Co.
Nolan Co., The
Pacific Car & Foundry Co.
Rogers Iron Wks.
Sanford Day Iron Works, Inc.
United States Steel Corp.
Wellman Engineering Co.

DUST COLLECTION EQUIPMENT

AEROTURN—see KOPPERS CO. INC., METAL PROD. DIV.
American Air Filter Co., Inc.
AMERICAN BRATTICE CLOTH CORP.
American Standard, American Blower Div.
Barber-Greene Co.
Bemis Bro. Bag Co.
Bethlehem Steel Co.
Buell Engineering Co., Inc.
Convair, Inc.
COTTRELL—see WESTERN PRECIPITATION CORP.
Ducon Co. Inc., The
Failing Co., George E.
Hazemag USA, Inc.
Hirsch Brothers Machinery Co., Inc.
Holman Bros. Ltd.
Iowa Manufacturing Co.
Johnson-March Corp., The
JOY MANUFACTURING CO.
KLOECKNER-HUMBOLDT-DEUTZ, AG—DIESEL ENERGY CORP.
KOPPERS CO. INC., METAL PROD. DIV.
Majac, Inc.
Martindale Electric Co.
Mayhew Machine & Supply Co.
Mine Safety Appliances Co.
MULTICLONE—see WESTERN PRECIPITATION CORP.
National Filter Media Corp.
Northern Blower Co., The
Research Cottrell, Inc.
Spencer Turbine Co., The
STANDARD STEEL CORP.
STURTEVANT MILL CO.
Textron Inc., Homelite Div.
Thor Power Tool Co.
Torit Manufacturing Co.
U. S. Hoffmann Machinery Corp., Industrial Equipment Divs.
WESTERN PRECIPITATION CORP.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.
Westinghouse Electric Corp.
Wheelabrator Corp.

ELECTRICAL EQUIPMENT

See also Magnetic Equipment; Locomotives; Batteries; Chargers; Welding Equipment and Supplies; Hoisting Equipment; Communications; Winches; Cable and Conduit, Trolley Equip.

Cable and Conduit

See Cable and Conduit

Floodlights, Outdoor

Revere Electric Mfg. Co.

Instruments

See Controls; Recorders

Light Plants

ACEC
Allis-Chalmers Mfg. Co., Engine—Material Handling Div.
American Locomotive Co.
Assoc. Electrical Industries Ltd.
Caterpillar Tractor Co.
Cummins Engine Co., Inc.
Fairbanks, Morse & Co.
Fairbanks, Morse & Co./Dorman & Co. Ltd.
General Electric Co., Apparatus Sales Div.
General Motors Corp.
Graybar Electric Co.
HARNISCHFEGER CORP.
Hobart Bros. Co.
JOY MANUFACTURING CO.
Katolight Corp.
Kohler Co.
Minneapolis-Moline Co.
NORDBERG MFG. CO.
Sheppard Co., R. H.
Stearns-Roger Mfg. Co.
Studebaker Packard Corp., Onan Div.
Textron Inc., Homelite Div.
Thor Power Tool Co.
U. S. Steel Corp., Oil Well Supply Div., Witte Engine Works
Waukesha Motor Co.
Westinghouse Electric Corp.
White Motor Co., Diesel Engine Div.

Miscellaneous (Condensers, Resistors, Potentiometers, etc.)

ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
British Insulated Callenders Cables Ltd.
General Electric Co., Apparatus Sales Div.
Graphite Metallizing Corp.
Graybar Electric Co.
Mosebach Manufacturing Co.
Ohio Carbon Co., The

Motors, Generators, and Converters

ACEC
Louis Allis Co.
Allis-Chalmers Mfg. Co., Industries Group
ASEA ELECTRIC, INC.
Assoc. Electrical Industries Ltd.
Carrier Corp.
Caterpillar Tractor Co.
Connecticut Telephone & Electric Corp.
Eaton Manufacturing Co.
Electric Machinery Mfg. Co.
English Electric Co. Ltd.
Enterprise Engine & Machinery Co.
Electro-Motive Div., Gen. Motors Corp.
Fairbanks, Morse & Co.
General Dynamics Corp., Electro Dynamic Div.
General Electric Co., Apparatus Sales Div.
General Motors Corp., Delco Products Div.
General Motors Corp., Detroit Diesel Engine Div.
Graybar Electric Co., Inc.
HARNISCHFEGER CORP.
Howell Electric Motors Co.
Katolight Corp.
Lancashire Dynamo & Crypto Ltd.
Lima Electric Motor Co., The
Lincoln Electric Co., The
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Reliance Electric & Engineering Co.
Robbins & Myers, Inc.
Sheppard Co., Inc., The R. H.
Stearns Magnetic Products Div., Indiana General Corp.
Sterling Electric Motors, Inc.
Studebaker Packard Corp., Onan Div.
Syntron Co.
Textron Inc., Homelite Div.
Thor Power Tool Co.
U. S. Electrical Motors, Inc.
Waukesha Motor Co.
Westinghouse Air Brake Co., Le Roi Div.
Westinghouse Electric Corp.
White Motor Co.
Worthington Corp.

Package Substation

ACEC
Allis-Chalmers Mfg. Co., Industries Group
Assoc. Electrical Industries Ltd.
English Electric Co. Ltd.
Fairbanks, Morse & Co.
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
I-T-E Circuit Breaker Co.
National Supply Co. (Penna.)
Square D Co., E C & M Div.
Westinghouse Electric Corp.

Switches & Starters

ACEC
ALLIS-CHALMERS MFG. CO.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Electric Machinery Mfg. Co.
English Electric Co. Ltd.
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
I-T-E Circuit Breaker Co.
JOY MANUFACTURING CO.
Minneapolis-Honeywell, Regulator Co., Micro Switch Div.
Mosebach Manufacturing Co.
Ohio Brass Co.
Reliance Electric & Engineering Co.
Rodale Mfg. Co., Inc.
Square D Co., E C & M Div.
Wadsworth Elec. Mfg. Co., Inc.
Westinghouse Electric Corp.

Transformers and Rectifiers

ACEC
Allis-Chalmers Mfg. Co., Industries Group
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Basic Products Corp., Hevi-Duty Electric Co. Div.
Carpco Mfg. Inc.
English Electric Co. Ltd.
Essex Wire Corp., Paranite Wire & Cable Div.
Euclid Electric & Mfg. Co., The
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
I-T-E Circuit Breaker Co.
Reliance Electric & Engineering Co.
Research-Cottrell, Inc.
Rodale Mfg. Co., Inc.
Syntron Co.
Westinghouse Electric Corp.

Voltage Regulators

ACEC
Allis-Chalmers Mfg. Co.
Allis Co., The Louis
Assoc. Electrical Indstries Ltd.
ASEA ELECTRIC INC.
Basic Products Corp., Hevi-Duty Electric Co. Div.
Electric Machinery Mfg. Co.
English Electric Co. Ltd.
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
Reliance Electric & Engineering Co.
Westinghouse Electric Corp.

ELECTRIC WHEEL DRIVE

See Trucks

ENGINE EXHAUST CONDITIONERS

Underground

ACEC
Eimco Corp.
Fate-Root-Heath Co., The, Plymouth Locomotive Works Div.
GETMAN BROS. MFG. CO.
Hack Eng. Co.
Hirsch Brothers Machinery Co., Inc.
National Mine Service Co.
Oxy-Catalyst, Inc.
Ruth Co., The
Universal Dredge Mfg. Co.

ENGINEERING SERVICES

See Plant Design and Construction; Exploration Services; Consulting Mining Engineers; Consulting Metallurgical Engineers

ENGINEERING SUPPLIES & DRAFTING EQUIPMENT

See also Surveying Instruments; Copy Machines
ACEC
Jausch & Lomb Optical Co.
Berger & Sons, Inc.
Dietzgen Co., Eugene
Fennel Sohne KG, Otto
General Aniline & Film Corp., Ozalid Div.
Geo-Optics & Paper Corp.
Kern Instruments, Inc.
Keuffel & Esser Co.
Leitz Co., The A.
Lufkin Rule Co.
Pack Manufacturing Co.
Post Co., Frederick
White Instrument Co., David
Wild Heerbrugg Instruments, Inc.
Zeiss, Carl

ENGINES

See also Electrical Equipment

Diesel and Semi-Diesel

ACEC
Alco Products, Inc.
Allis-Chalmers Mfg. Co., Const. Machy. Div.
Allis-Chalmers Mfg. Co., Industries Group
Allis-Chalmers Mfg. Co., Engine—Material Handling Div.
American Locomotive Co.
American M.A.N. Corp.
Baldwin-Lima-Hamilton Corp., Eddystone Div.
Caterpillar Tractor Co.
CHICAGO PNEUMATIC TOOL CO.
Cooper-Bessemer Corp., The
Cummins Engine Co., Inc.
Curtiss-Wright Corp.
Diesel Energy Corp., Kloeckner-Humboldt-Deutz AG
English Electric Co. Ltd.
Enterprise Engine & Machinery Co.
Fairbanks, Morse & Co.
Fairbanks, Morse & Co./Dorman & Co. Ltd., W. H.
General Motors Corp., Detroit Diesel Engine Div.
General Motors Corp.—Electromotive Div.
HARNISCHFEGER CORP.
INGERSOLL-RAND CO.
International Harvester Co.
KLOECKNER-HUMBOLDT-DEUTZ, AG—DIESEL ENERGY CORP.
Minneapolis-Moline Co.
NORDBERG MFG. CO.
P & H—see HARNISCHFEGER CORP.
Perkins Ltd., F.
Reynolds-French & Co.
Rolls-Royce Ltd.
Sheppard Co. Inc., R. H.
Waukesha Motor Co.
White Motor Co., The
U. S. Steel Corp., Oil Well Supply Div., Witte Engine Works
Worthington Corp.

Gas

Allis-Chalmers Mfg. Co., Engine Material Handling Div.
American M. A. N. Corp.
CHICAGO PNEUMATIC TOOL CO.
Clinton Engines Corp.
Cooper-Bessemer Corp., The
Fairbanks, Morse & Co.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Mannesmann-Meer AG
NORDBERG MFG. CO.
Reynolds-French & Co.
Studebaker-Packard Corp., Onan Div.
U. S. Steel Corp., Oil Well Supply Div., Witte Engine Works
Waukesha Motor Co.
Wisconsin Motor Corp.

Gasoline

Allis-Chalmers Mfg. Co., Const. Machy. Div.
Allis-Chalmers Mfg. Co., Industries Group
Allis-Chalmers Mfg. Co., Engine—Materials Handling Div.
Briggs & Stratton Corp.
Clinton Engines Corp.
Fairbanks, Morse & Co.
G. M. C., Allison Div.
International Harvester Co.
Klockner-Humboldt-Deutz AG
Kohler Co.
Le Roi Div., Westinghouse Air Brake Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Minneapolis-Moline Co.
National Supply Co., The, Engine Div.
Studebaker-Packard Corp., Onan Div.
Textron Inc., Homelite Div.
Turbo Jet—see G. M. C., Allison Div.
U. S. Steel Corp., Oil Well Supply Div., Witte Engine Works
Waukesha Motor Co.
Westinghouse Air Brake Co., Le Roi Div.
Westinghouse Air Brake Co. (Pa.)
White Motor Company, Diesel Engine Div.
Willys Motors, Inc.
Wisconsin Motor Corp.

Steam

Reynolds-French & Co.

Turbine

ACEC

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Allis-Chalmers Mfg. Co.
American M.A.N. Corp.
Assoc. Electrical Industries Inc.
Cooper-Bessemer Corp., The
Davis Foundry & Machine Wks.
English Electric Co. Ltd.
General Electric Co., Apparatus Sales Div.
Reynolds-French & Co.
Solar Aircraft Co.
Waukesha Motor Co.
Westinghouse Electric Corp.

EXCAVATORS

See also Tractors and Attachments; Dredges and Dredge Buckets; Loaders; Monitors; Scrapers

Backhoes

Allis-Chalmers Mfg. Co., Construction Equipment Div.
American Brake Shoe Co.
American Hoist & Derrick Co.
BALDWIN-LIMA-HAMILTON CORP.
Bay City Shovels, Inc.
Bucyrus-Erie Co.
Clark Equip. Co., Construction Mach. Div.
ESCO Corp.
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Hough Co., The Frank G.
Joost Mfg. Co.
Koehring Co.
LIMA—see BALDWIN-LIMA-HAMILTON CORP.
Link-Belt Speeder Corp.
Lorain—see Thew Shovel Co.
MACHINERY CENTER INC.
Manitowoc Engineering Corp.
MARION POWER SHOVEL CO.
Northwest Engineering Co.
Pettibone Mulliken Corp.
Quick-Way Truck Shovel Co.
Schield Bantam Co. Inc.
SCHRAMM, INC.
Smith & Sons (Rodley), Ltd.
Thew Shovel Co., The
Tractomotive Corp.
Unit Crane & Shovel Corp.
Westinghouse Air Brake Co., Le Roi Div.
Willys Motors, Inc.

Bucket Chains

Gar Wood Industries, Inc.
Hirsch Brothers Machinery Co. Inc.
NATIONAL MALLEABLE & STEEL CASTINGS CO.

Bucket Wheel

Bucyrus-Erie Co.
Gar Wood Industries, Inc.
HEWITT-ROBINS INC.
Link-Belt Co.

Cableways—Slackline

Bethlehem Steel Co.
British Ropeway Engineering Co. Ltd.
Clark Equip. Co., Construction Mach. Div.
Hirsch Brothers Machinery Co. Inc.
Sauerman Bros. Inc.
Superior-Lidgerwood-Mundy Corp.
Washington Iron Works
Westfalische Union AG

Cableways—Tautline

Bethlehem Steel Co.
British Ropeway Engineering Co. Ltd.
Clark Equip. Co., Construction Mach. Div.
Fraser & Chalmers Eng. Wks.
Sauerman Bros. Inc.
Superior-Lidgerwood-Mundy Corp.
Washington Iron Works
Westfalische Union AG

Draglines—Diesel

American Hoist & Derrick Co.
BALDWIN-LIMA-HAMILTON CORP.
Bay City Shovels, Inc.
Bethlehem Steel Co.
Bucyrus-Erie Co.
Clark Equip. Co., Const. Mach. Div.
Demag Aktiengesellschaft
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Hirsch Brothers Machinery Co. Inc.
Koehring Co.
LIMA—see BALDWIN-LIMA-HAMILTON CORP.
Link-Belt Speeder Corp.
Manitowoc Engineering Corp.
MARION POWER SHOVEL CO.
Northwest Engineering Co.
Page Engineering Co.
Quick-Way Truck Shovel Co.
Schield Bantam Co. Inc.
Smith & Sons (Rodley) Ltd., Thomas Thew Shovel Co., The
Unit Crane & Shovel Corp.
Washington Iron Works

Draglines—Electric

American Hoist & Derrick Co.
Bantam—see Schield Bantam Co.
Bay City Shovels, Inc.
Bucyrus-Erie Co.
Demag Aktiengesellschaft
Fraser & Chalmers Eng. Wks.
HARNISCHFEGER CORP.
Hirsch Brothers Machinery Co. Inc.
Koehring Co.
Link-Belt Speeder Corp.
Manitowoc Eng. Co.
MARION POWER SHOVEL CO.
Northwest Engineering Co.
Page Engineering Co.
Rolls-Royce Ltd.
Schield Bantam Co.
Thew Shovel Co., The
Unit Crane & Shovel Corp.

Scrapers, Self-Propelled

ACEC
Allis-Chalmers Mfg. Co., Const. Machy. Div.
Allis-Chalmers Mfg. Co., Industries Group
BALDWIN-LIMA-HAMILTON CORP.
CW—see Curtiss-Wright Corp., South Bend Div.
Caterpillar Tractor Co.
Carryall—see Letourneau-Westinghouse Co.
Clark Equipment Co., Const. Mach. Div.
Curtiss-Wright Corp., South Bend Div.
ESCO Corp.
GENERAL MOTORS CORP., EUCLID DIV.
Hirsch Brothers Machinery Inc.
International Harvester Co.
Landis Steel Co.
Le Tourneau-Westinghouse Co.
Link-Belt Speeder Corp.
MACHINERY CENTER INC.
Michigan—see Clark Equipment Co.
M-R-S Manufacturing Co.
Rogers Iron Works Co.
Sanford-Day Iron Wks.
Tournapull—see Le Tourneau-Westinghouse Co.
Transloader—see Sanford-Day Iron Works, Inc.
Westinghouse Air Brake Co. (Pa.)

Shaft Muckers

See Shaft Sinking

Shovels, Power—Diesel

American Hoist & Derrick Co.
BALDWIN-LIMA-HAMILTON CORP.
Bantam—see Schield Bantam Co.
Bay City Shovels, Inc.
Benoto, Inc.
Bucyrus-Erie Co.
Caterpillar Tractor Co.
Clark Equip. Co., Const. Mach. Div.
Clyde Iron Works, Inc.
Demag Aktiengesellschaft
EIMCO Corp.
ESCO Corp.
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
Hirsch Brothers Machinery Co. Inc.
Koehring Co.
LIMA—see BALDWIN-LIMA-HAMILTON CORP.
Link-Belt Speeder Corp.
Manitowoc Engineering Corp.
MARION POWER SHOVEL CO.
Michigan—see Clark Equipment Co.
Northwest Engineering Co.
P & H—see HARNISCHFEGER CORP.
Quick-Way Truck Shovel Co.
Schield Bantam Co. Inc.
Smith & Sons (Rodley) Ltd., Thomas Thew Shovel Co., The
Traxcavator—see Caterpillar Tractor Co.
Unit Crane & Shovel Corp.

Shovels, Power—Electric

American Hoist & Derrick Co.
Bay City Shovels, Inc.
Bucyrus-Erie Co.
Demag Aktiengesellschaft
EIMCO Corp.
ESCO Corp.
Goodman Mfg. Co.
HARNISCHFEGER CORP.
Koehring Co.
Link-Belt Speeder Corp.
Lorain—see Thew Shovel Co.
Manitowoc Engineering Corp.
MARION POWER SHOVEL CO.
Mining Progress, Inc.
Northwest Engineering Co.
P & H—see HARNISCHFEGER CORP.
Schield Bantam Co.
Smith, Thos., & Sons (Rodley) Ltd.
Thew Shovel Co., The
Unit Crane & Shovel Corp.

Parts and Attachments

(For above)

A & A Mfg. Co., Inc.
ALLOY STEEL & METALS CO.
American Hoist & Derrick Co.
AMERICAN BRAKE SHOE CO.
BALDWIN-LIMA-HAMILTON CORP.
Bay City Shovels Inc.
Bucyrus-Erie Co.
Caterpillar Tractor Co.
Clark Equip. Co., Construction Mach. Div.
COLORADO FUEL & IRON CORP.
COLUMBIA STEEL CASTING CO., INC.
Curtiss-Wright Corp., South Bend Div.
EIMCO Corp., The
Schramm, Inc.
ESCO Corp.
Gar Wood Industries, Inc.
GENERAL MOTORS CORP., EUCLID DIV.
HARNISCHFEGER CORP.
Harsco Corp., Taylor-Wharton Co. Div.
Hirsch Brothers Machinery Co. Inc.
Koehring Co.
LeTourneau-Westinghouse Co.
Link-Belt Speeder Corp.
Manitowoc Engineering Corp.
MARION POWER SHOVEL CO.
M-R-S Manufacturing Co.
Martin, Black & Co., Ltd.
Owen Bucket Co.
PACIFIC—see ALLOY STEEL & METALS CO.
Page Engineering Co.
Pettibone Mulliken Corp.
Quick-Way Truck Shovel Co.
Schield Bantam Co. Inc.
Smith & Sons (Rodley) Ltd., Thomas Thew Shovel Co., The
Unit Crane & Shovel Corp.
Westinghouse Air Brake Co., Ind. Products Div.
Westinghouse Air Brake Co., Le Roi Div.

EXPLORATION EQUIPMENT

See also Drills, Rock

Geochemical Equipment

Analytical Measurements, Inc.
Eberline Instrument Div., Reynolds Elect. & Eng. Co.
Heinrichs Geoexploration Co.
International Geophysics, Inc.
Lemaire Instruments
Menlo Research Laboratory
Mineral Engineers
Mobile Drilling, Inc.
Philips Electronic Instruments
Pioneer Geochemical Surveys Inc.

Geophysical Equipment

ACKER DRILL CO. INC.
Allied Geophysics
Analytical Measurements, Inc.
Askania-Werke AG
Bemis Bro. Bag Co.
Dectectron Div., Computer-Measurements Co.
Drilling Accessory & Mfg. Co. Inc.
Eberline Instrument Div., Reynolds Elect. & Eng. Co.
Failing Co., George E.
Geodynamics, Inc.
Geo-Optic & Paper Corp.
Geophysical Specialties Co.
Heinrichs Geoexploration Co.
HUGHES TOOL CO. (BITS)
International Geophysics, Inc.
Jordan International Co.
JOY MANUFACTURING CO.
LONGYEAR CO., E. J.
Mayhew Machine & Supply Co.
Mandrel Industries, Electro-Technical Labs. Div.
Menlo Research Laboratory
Mobile Drilling Inc.
Nuclear Corp. of America
Pick Laboratories
Salem Tool Co.
SCHRAMM, INC.
Texas Instruments, Inc., Industrial Products Group
Turner & Associates, Samuel F.
Uranium Instruments Co.
VARIAN ASSOCIATES
Westinghouse Electric Corp.
Winter-Weiss Co., The

EXPLORATION SERVICES

Aircraft

Aero Service Corp.
Aero Service Corp., Western
Bell Helicopter Co.
Fairchild Aerial Surveys, Inc.
Geodynamics Inc.
Heinrichs Geoexploration Co.
International Geophysics, Inc.
Meissner Engineers Inc.
Rick Helicopters
Uranium Instruments Co.
WINK CORP., F. W.
World Wide Aerial Surveys (Aust.) Pty. Ltd.

Drilling

BOYLES BROS. DRILLING CO.
Demag Aktiengesellschaft
DIAMOND DRILL CONTRACTING CO.
Geodynamics Inc.
Havlick, J. L.
Heinrichs Geoexploration Co.
Isbell Construction Co.
International Geophysics, Inc.
JOY MANUFACTURING CO.
Koebel Diamond Tool Co.
LONGYEAR CO., E. J.
MCCLINTOCK CO., R. S.
McDonald, T. J.
Meissner Engineers Inc.
Minerals Engineering Co.
Mobile Drilling
Pennsylvania Drilling Co., Penndrill Mfg. Co.
Smit & Co., Anton
SPANG & CO.
SPRAGUE & HENWOOD, INC.
Textron Inc., Homelite Div.
World Mining Consultants, Inc.
Yuba Manufacturing Co.

Surveying—Aerial

Abrams Aerial Survey Corp.
Aero Service Corp.
Aero Service Corp., Western
Canadian Aero Service Ltd.
CHAPMAN, WOOD AND GRISWOLD
Elliott, D. H.
Fairchild Aerial Surveys
Geodynamics, Inc.
Geo-Optic & Paper Corp.
Heinrichs Geoexploration Co.
Hunting Survey Corp. Ltd.
Hunting Technical Services, Inc.
International Geophysics, Inc.
KELLOGG EXPLORATION CO.
LONGYEAR CO., E. J.
Lundberg Explorations, Ltd.
Meissner Engineers Inc.
Menlo Research Lab.
Mineral Engineers
Rick Helicopters, Inc.
STILL & STILL
Tracerlabs, Inc.
Western Exploration Co.

Surveying—Geochemical

Atkins Technical Inc.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Geodynamics, Inc.
Geo-Optic & Paper Corp.
Geophysical Explorations Ltd.
Hunting Technical Services, Inc.
Heinrichs Geoexploration Co.
International Geophysics, Inc.
KELLOGG EXPLORATION CO.
Kelly Geophysical Services, Inc., Sherwin F.
LONGYEAR CO., E. J.
Menlo Research Lab.
Mineral Engineers
Nucleonic Corp. of America
Pioneer Geochemical Surveys Inc.
STILL & STILL
Texas Instruments
WISSER & COX

Surveying—Geological

Abrams Aerial Survey Corp.
Aero Service Corp.
Aero Service Corp., Western Allied Geophysics
BOYLES BROS. DRILLING CO.
Canadian Aero Service Ltd.
CHAPMAN WOOD, AND GRISWOLD
Davis, Leland J.
Elliott, D. H.
Fairchild Aerial Surveys, Inc.
Frederick, Francis H.
Geodynamics, Inc.
Geo-Optic & Paper Corp.
Geophysical Explorations Ltd.
Heinrichs Geoexploration Co.
Hunting Airborne Geophysics Ltd.
Hunting Technical Services Inc.
International Geophysics, Inc.
Kane, William G.
Kelly Geophysical Services Inc., Sherwin F.
Keegle, Engineers, C. P.
KELLOGG EXPLORATION CO.
LONGYEAR CO., E. J.
Mineral Engineers
Pioneer Geo Chemical Surveys Inc.
Seismograph Service Corp.
STILL & STILL
Turner & Associates, Samuel F.
Wilson Exploration Co.
WISSER & COX
World Mining Consultants, Inc.

Surveying—Geophysical

Aero Service Corp.
Aero Service Corp., Western Allied Geophysics
Atkins Technical Inc.
Canadian Aero Service, Ltd.
Fairchild Aerial Surveys
Frederick, Francis H.
Geodynamics, Inc.
Geo-Optic & Paper Corp.
Geophysical Explorations Ltd.
Geophysical Service Inc.
Geophysical Specialties Co.
Heinrichs Geoexploration Co.
Hunting Airborne Geophysics Ltd.
Hunting Geophysical Services, Inc.
International Geophysics, Inc.
KELLOGG EXPLORATION CO.
Kelly Geophysical Services Inc., Sherwin F.
LONGYEAR CO., E. J.
Lundberg Explorations, Ltd.
Menlo Research Laboratory
Mineral Engineers
Mining & Geophysical Services Ltd.
Mobile Drilling Inc.
Nucleonic Corp. of America
Peale, Rogers
Seismograph Service Corp.
STILL & STILL
Texas Instruments Inc.
Turner & Associates, Samuel F.
Tracerlab, Inc.
Uranium Instruments Co.
Wilson Exploration Co.
WISSER & COX
World Mining Consultants, Inc.

EXPLOSIVES

See Blasting Supplies

FANS

See Ventilation Equipment and Supplies

FASTENERS, BELT

ABCs Scale Div., McDowell Co., Inc.
American Rubber Mfg. Co.
Armstrong-Bray & Co.
Bonded Scale & Machine Co.
Carlyle Rubber Co., Inc.
Clipper Belt Lacer Co.
Crescent Belt Fastener Co., Inc.
Flexible Steel Lacing Co.
Gates Rubber Co., The
General Splice Corp.
GOODALL RUBBER CO.
Goodrich Industrial Products Co., B. F.
NATIONAL MINE SERVICE CO.
Rhoads, J. E., & Sons
Russell Mfg. Co., The
Stephens-Adamson Mfg. Co.
Three Point Belt Lacing Inc.

FEEDERS, ORE

Apron

American Brake Shoe Co.
AMSCO—see American Brake Shoe Co.
Barber-Greene Co.
Bonded Scale & Mach Co.
Chain Belt Co.
Cleveland Vibrator Co., The
Connellsville Corp.
Conveyor Co., The
Demag Aktiengesellschaft
DENVER EQUIPMENT CO.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Goodman Mfg. Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
Harsco Corp., Taylor-Wharton Co. Div.
Hazemag
HEWITT-ROBINS, INC.
Hirsch Brothers Machinery Co. Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann-Engineering Works
McDowell Co., Inc.
MCLANAHAN CORP.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO.
Morse Bros. Machinery Co.
NATIONAL IRON CO.
NORDBERG MFG. CO.
Pettibone Mulliken Corp.
Poor & Co., Inc., Pioneer Engineering Div.
Richardson Scale Co.
Rogers Iron Works Co.
Ross Screen & Feeder Co.
Smith Engineering Works
SOUTHWESTERN ENG. CO.
Stephens-Adamson Mfg. Co.
Straub Mfg. Co., Inc.
Traylor Eng. & Mfg. Co. Div., Fuller Co.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Washington Machinery Co.

Belt

ABCs Scale Div., McDowell Co., Inc.
American Rubber Mfg. Co.
B. I. F. Industries, Inc.
Barber-Greene Co.
Bonded Scale & Machine Co.
Chain Belt Co.
COEUR D'ALENES CO., THE
Continental Conveyor & Equip. Co.
Conveyor Co., The
Demag Aktiengesellschaft
DENVER EQUIPMENT CO.
Flexible Steel Lacing Co.
Galigher Co., The
Gebruder Hischmann Maschinenfabrik
Goodrich Industrial Products Co., B. F.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
HARDINGE CO., INC.
HEWITT-ROBINS INC.
Hirsch Brothers Machinery Co. Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works
Magnetic Eng. & Mfg. Co.
McDowell Co., Inc.
MCLANAHAN CORP.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
The National Filter Media Corp.
NATIONAL IRON CO.
National Mine Service Co.
Pettibone Mulliken Corp.
Poor & Co., Inc., Pioneer Engineering Div.
Richardson Scale Co.
Rogers Iron Works Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Straub Mfg. Co. Inc.
Telluride Iron Works Co.
Universal Dredge Mfg. Co.
Universal Road Mach.
Washington Machinery Co.
Yuba Consolidated Industries Inc.

Chain

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Amsco—see American Brake Shoe Co.
Bonded Scale & Machine Co.
Chain Belt Co.
Connellsville Corp.
Continental Conveyor & Equip. Co.
Conveyor Co., The
Demag Aktiengesellschaft
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hazemag
HEWITT-ROBINS
Hirsch Brothers Machinery Co. Inc.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works
Mining Progress, Inc.
Morse Chain Co.
Ross Screen & Feeder Co.
Stephens-Adamson Mfg. Co.
Telluride Iron Works Co.
Universal Dredge Mfg. Co.

Constant Weight

ABCs Scale Division, McDowell Co., Inc.
B-I-F Industries Inc.
Conveyor Co., The
DENVER EQUIPMENT CO.
Hack Engineering Co.
HARDINGE CO., INC.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Link-Belt Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Schaffer Poidometer Co.
Simplicity Engineering Co.
Syntron Co.
Universal Dredge Mfg. Co.
Washington Mach. Co.

Pan

American Brake Shoe Co.
Barber-Greene Co.
Bonded Scale & Machine Co.
Chain Belt Co.
Christian Engineers, J. D.
Cleveland Vibrator Co., The
COEUR D'ALENES CO., THE
Connellsville Corp.
Conveyor Co., The
DENVER EQUIPMENT CO.
Eriez Mfg. Co.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
Harsco Corp., Taylor-Wharton Co. Div.
Hazemag
HEWITT-ROBINS
Hirsch Brothers Machinery Co. Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works
MCLANAHAN CORP.
McNally Pittsburgh Co.
NATIONAL IRON CO.
Poor & Co., Inc., Pioneer Engineering Div.
Rogers Iron Works Co.
Scott Concentrators
Simplicity Engineering Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Telluride Iron Works Co.
Traylor Eng. & Mfg. Co. Div., Fuller Co.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Washington Machinery Co.

Reagent

ABCs Scale Div., The McDowell Co.
COEUR D'ALENES CO., THE
Davison & Co. (Hexham) Ltd.
DENVER EQUIPMENT CO.
Eriez Manufacturing Co.
Fischer & Porter Co.
Galigher Co., The
Geary—see Galigher Co., The
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Infilco, Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
MASSCO-ADAMS—see MINE & SMELTER SUPPLY CO.
MINE & SMELTER SUPPLY CO.
Morse Bros. Machinery Co.
Syntron Co.
WESTERN MACHINERY CO.

Table

Allis-Chalmers Mfg. Co., Industries Group
Carpco Mfg. Inc.
Chain Belt Co.
CONCENCO—see DEISTER CONCENTRATOR CO.
Continental Conveyor & Equip. Co.
DEISTER CONCENTRATOR CO.
Fraser & Chalmers Eng. Wks.
Gebruder Hischmann Maschinenfabrik
Hammermills Inc.
HARDINGE CO., INC.
HEWITT-ROBINS
Jeffrey Mfg. Co.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Pulva Corp.
Stephens-Adamson Mfg. Co.
Traylor Eng. & Mfg. Co., Div. Fuller Co.

FILTER MEDIA

Allied Witan Co. Inc.
American Air Filter Co. Inc.
American Machine & Metals Inc., Filtration Engineers Div.
Arizona Bag Co.
CELITE—see JOHNS-MANVILLE
Cleveland Wire Cloth & Mfg. Co., The
Carborundum Co., The
COAST MFG. & SUPPLY CO.
Dicalite Div., Great Lakes Carbon Corp.
DORR-OLIVER INC.
EIMCO Corp.
Filter Fabrics, Inc.
Great Lakes Carbon Corp., Mining & Mineral Prods. Div.
Hankison Corp.
Hirsch Brothers Machinery Co. Inc.
Infilco Inc.
JOHNS-MANVILLE SALES CORP.
Ludlow-Saylor Wire Cloth Co.
Menardi & Co.
National Filter Media Corp.
Norton Company
Pendleton Woolen Mills
PETERSON FILTERS & ENGINEERING CO.
Staplex Co., The, Air Sampler Div.
Technical Fabricators Inc.
Van Rogers & Waters Inc., Braun Chemical Div.
Van Rogers & Waters Inc., Braun-Knecht-Heimann Co. Div.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

FILTERS

Air

Allied Witan Co., Inc.
American Air Filter Co., Inc.
Armour Alliance Industries
Assoc. Electrical Industries Ltd.
Bemis Bro. Bag Co.
Carriers Corp.
CHICAGO PNEUMATIC TOOL CO.
COAST MFG. & SUPPLY CO.
Coppus Engineering Corp.
Ducon Co.
GARDNER-DENVER CO.
General Cable Corp.
GOODYEAR TIRE & RUBBER CORP.
Hankison Corp.
Hazemag USA Inc.
Hirsch Brothers Machinery Co. Inc.
Johnson March Corp.
Kennedy-Van Saun Mfg. & Eng. Corp.
Lincoln Engineering Co., Div. McNeil Machine & Engr. Co.
Mine Safety Appliance Co.
Pendleton Woolen Mills
Staplex Co., The
Stewart-Warner Corp., Alemite Div.
Technical Fabricators Inc.
Thor Power Tool Co.
Ultra-aire—see Mine Safety Appliances Co.
WESTERN PRECIPITATION CORP.
Westinghouse Air Brake Co., Ind. Products Div.
Westinghouse Electric Corp., Sturtevant Div.
Wheelabrator Corp.
Winslow Engineering & Mfg. Co.

Concentrate

AMERICAN—see DORR-OLIVER INC.
American Machine & Metals, Inc., Filtration Engineers Div.
Bemis Bros. Bag Co.
Bird Machine Co.
Booth Co. Inc., The
Buck & Associates, Carl
BURT—see MINE & SMELTER SUPPLY CO.
Carpco Mfg. Inc.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
DORRCO—see DORR-OLIVER INC.
EIMCO Corp.
Filtration Engineers, Div. American Machine & Metals, Inc.
Galigher Co., The
HARDINGE CO., THE
Hirsch Brothers Machinery Co. Inc.
Infilco, Inc.
KELLY—see DORR-OLIVER INC.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
MINE & SMELTER SUPPLY CO.
Morse Bros. Machinery Co.
OLIVER—see DORR-OLIVER INC.
PETERSON FILTERS & ENGINEERING CO.
SWEETLAND—see DORR-OLIVER INC.
Technical Fabricators Inc.

Oil

DORR-OLIVER INC.
Eriez Manufacturing Co.
Frantz Co., Inc., S. G.
GARDNER-DENVER CO.
General Cable Corp.
Infilco, Inc.
Stearns Magnetite Products Div., The Indiana General Corp.
Technical Fabricators Inc.
Thor Power Tool Co.
U. S. Hoffman Machinery Corp.
Winslow Engineering & Mfg. Co.

FIRE BRICKS

See also Refractories
Babcock & Wilcox Co., The
Carborundum Co., The, Refractories Div.
Carey Mfg. Co., The Philip
Denver Fire Clay Co., The
JOHNS-MANVILLE SALES CORP.
Kaiser Aluminum & Chem. Corp., Refractories Div.
Norton Co.
Robinson Clay Prod. Co., The
SPANG & CO.

FIRST AID SUPPLIES

See Safety Equipment

FLOTATION MACHINES

Booth Co., Inc., The
COEUR D'ALENES CO., THE
DORR-OLIVER INC.
DENVER EQUIPMENT CO.
Fagergrens & Steffensens—see Western Machinery Co.
Fraser & Chalmers
Galigher Co., The
Heyl & Patterson Inc.
Infilco, Inc.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Magnetic Engineering & Mfg. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Morse Bros. Machinery Co.
National Tank & Pipe Co.
SALA MASKINFABRIKS AB
Stearns-Roger Mfg. Co., The
U. S. Hoffman Machinery Corp., Industrial Equipment Divs.
WESTERN MACHINERY CO., WEMCO DIV.
Westinghouse Electric Corp., Sturtevant Div.

FLOTATION REAGENTS

See Reagents and Chemicals

FORK LIFTS

See Loaders

FRAMERS

See Saws, Power

FRICTION MATERIAL

American Brake Shoe Co.
Carey Mfg. Co., The Philip
Gatke Corp.
Goodrich Industrial Prods. Co., B. F.
JOHNS-MANVILLE SALES CORP.
Porter Co., Inc., H. K., Thermoid Div.
Russell Mfg. Co., The
Tool Steel Gear & Pinion Co.

FURNACES

See Pyrometallurgical Equipment

FUSE

See Blasting Equipment

GATES

See Bins, Chutes and Accessories

GAUGES

Air Reduction Sales Co.
Aldon Co., The
Bailey Meter Co.
Beckman Instruments, Inc.
Blackhawk Industrial Div.
Bristol Co., The
Daystrom Inc., Weston Instrument Div.
Fielden Electronics Ltd.
Fischer & Porter Co.
Foxboro Co., The
General Electric Co., Apparatus Sales Div.
Industrial Nucleonics Corp.
Infilco Inc.
Lufkin Rule Co.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Norwood Controls Unit
Nuclear-Chicago Corp.
Pyrometer Instrument Co. Inc., The
SPANG & CO.
Tracerlab, Inc.

GEAR MOTORS

See Motors

GEARS

See also Speed Changers; Open Gearing; Drives; Shaft-Mounted Drives
ACEC
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
AMSCO—see American Brake Shoe Co.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Bethlehem Steel Co.
COEUR D'ALENES CO., THE
COLUMBIA STEEL CASTINGS CO., INC.
Conveyor Co., The
Demag Aktingesellschaft
Dodge Manufacturing Corp.
Eaton Manufacturing Co., Cleveland Worm & Gear Div.
Falk Corp., The
Farrel-Birmingham Co., Inc.
Foote Co.
General Electric Co., Apparatus Sales Div.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Mining Progress, Inc.
Morse Chain Co.
Napso Industries Inc.
Ohio Gear Co.
Penn Machine Co.
Philadelphia Gear Works, Inc.
Stearns-Roger Mfg. Co., The
Stephens-Adamson Mfg. Co.
Tool Steel Gear & Pinion Co.
Twin Disc Clutch Co.
U. S. Electrical Motors, Inc.
Universal Gear Works, Inc.
Western Gear Corp. (Calif.)
Westinghouse Electric Corp.
Worthington Corp.

GEIGER & SCINTILLATION COUNTERS

See also Exploration Equipment
Allied Geophysics
BOULDER SCIENTIFIC CO.
Carpco Mfg. Inc.
Colorado Assaying Co.
Eberline Instrument Corp.
Electro-Technical Labs.
General Electric Co.
Menlo Research Lab.
Nuclear-Chicago Corp.
Nucleonic Corp. of America
Philips Electronics Instruments
Pick Laboratories
Tracerlab Inc.
Uranium Instruments Co.
Universal Transistor Products Corp.
Van Waters & Rogers Inc., Braun Chemical Div.

GENERATORS

See Electrical Equipment

GEOPHYSICAL SURVEYS

See Exploration Services

GIANTS

See Monitors

GRADERS

Adams—see Le Tourneau Westinghouse Co.
Allis-Chalmers Mfg. Co., Const. Machy. Div.
Allis-Chalmers Mfg. Co., Industries Group
Austin Western—see Baldwin-Lima-Hamilton Corp.
Caterpillar Tractor Co.
EL LOADER—see HARNISCHFEGER CORP.
Huber-Warco Co.
LeTourneau-Westinghouse Co.
Pettibone-Mulliken Corp.

GRINDERS

See Sharpeners, Rock Bit

GRINDING EQUIPMENT

See also Pulverizers

Autogenous

HARDINGE CO., INC.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
MINE & SMELTER SUPPLY CO.

Ball Mills

Allis-Chalmers Mfg. Co., Industries Group
Babcock & Wilcox Co.
Bico, Inc.
Booth Co. Inc., The
COATES STEEL PRODS. CO.
COEUR D'ALENES CO., THE
DENVER EQUIPMENT CO.
Dravo Corp.
EIMCO Corp.
Foster Wheeler Corp.
Galigher Co., The
Gebruder Hischmann Maschinenfabrik
GRUENDLER CRUSHER & PULVERIZER CO.
HARDINGE CO., INC.
Hirsch Brothers Machinery Co., Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LAKE SHORE, INC.
Linatex Corp. of America
Live Roller Mills Mfg. Co.
MINE & SMELTER SUPPLY CO.
NORDBERG MFG. CO.
Reynolds-French & Co.
SMIDTH & CO., F. L.
Stearns-Roger Mfg. Co., The
Straub Mfg. Co., Inc.

Ball Mill Chargers

HARDINGE CO., INC.
Hirsch Brothers Machinery Co., Inc.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.

Balls

ACF Industries, Inc., American Car & Foundry Div.
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO.
American Forge Co., The, Pacific States Steel Corp. Div.
Babcock & Wilcox, The
Bethlehem Steel Co.
CF&I—see COLORADO FUEL & IRON CORP., THE
Calumet & Hecla, Inc., Calumet Div.
CARBEX—see COATES STEEL PRODUCTS CO.
COATES STEEL PRODUCTS CO.
COEUR D'ALENES CO., THE
COLORADO FUEL & IRON CORP.
Concavex—see Allis-Chalmers Mfg. Co.
FAGERSTA STEELS PACIFIC INC.
Firth Sterling Inc.
Foster Wheeler Corp.
General Motors Corp., New Departure Div.
Granby Mining Co., Ltd., Allenby Foundry Div.
HARDINGE CO., INC.
Kennametal, Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
MINE & SMELTER SUPPLY CO.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Ni Hard—see Calumet & Hecla Div.
Pacific States Steel Corp.
Sheffield Div., Armco Steel Corp.
SKF Industries Inc.
United States Steel Corp.,, Columbia-Geneva Steel Div.

Liners

Allis-Chalmers Mfg. Co., Industries Group
American Brake Shoe Co.
Babcock & Wilcox, The
Bethlehem Steel Export Corp.
Calumet & Hecla, Inc., Calumet Div.
COEUR D'ALENES CO., THE
COLUMBIA STEEL CASTING CO. INC.
DENVER EQUIPMENT CO.
Eimco Corp.
ESCO Corp.
Gebruder Hischmann Maschinenfabrik
Granby Mining Co., Ltd., Allenby Foundry Div.
HARDINGE CO., INC.
Harsco Corp., Taylor-Wharton Co., Div.
Hirsch Brothers Machinery Co., Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
MCLANAHAN CORP.
MINE & SMELTER SUPPLY CO.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Ni-Hard—see Calumet & Hecla, Inc., Calumet Div.
NORDBERG MFG. CO.
Sanford-Day Iron Works Inc.
SMIDTH & CO., F. L.
Traylor Eng. & Mfg. Co., Div. Fuller Co.
United States Steel Corp., Columbia-Geneva Div.

Pebble Mills

Allis-Chalmers Mfg. Co., Industries Group
DENVER EQUIPMENT CO.
Dravo Corp.
Eimco Corp.
HARDINGE CO., INC.
Hirsch Brothers Machinery Co., Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
Live Roller Mills Mfg. Co.
MARCY—see MINE & SMELTER SUPPLY CO.
MINE & SMELTER SUPPLY CO.
NORDBERG MFG. CO.
SMIDTH & CO., F. L.
Stearns-Roger Mfg. Co.
Straub Mfg. Co. Inc.
Traylor Eng. & Mfg. Co. Div., Fuller Co.
United States Steel Corp.

Rod Mills

Allis-Chalmers Mfg. Co., Industries Group
Bethlehem Steel Co.
COLORADO FUEL & IRON CORP.
DENVER EQUIPMENT CO.
Dravo Corp.
Eimco Corp.
Gebruder Hischmann Maschinenfabrik
General Electric Co.
HARDINGE CO., INC.
Hirsch Brothers Machinery Co., Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Live Roller Mills Mfg. Mfg. Co.
MARCY—see MINE & SMELTER SUPPLY CO.
MINE & SMELTER SUPPLY CO.
Morse Bros. Machinery Co.
NORDBERG MFG. CO.
F. L. SMIDTH & CO.
Stearns-Roger Mfg. Co. (Rod Chargers)
Straub Mfg. Co. Inc.
Traylor Eng. & Mfg. Co., Div. Fuller Co.

Rod Mill Chargers

HARDINGE CO. INC.
MINE & SMELTER SUPPLY CO.
Stearns-Roger Mfg. Co., The

Rods

Allis-Chalmers Mfg. Co., Industries Group
Bethlehem Steel Co.
CF&I—see COLORADO FUEL & IRON CORP.
COLORADO FUEL & IRON CORP.
DENVER EQUIPMENT CO.
FAGERSTA STEELS PACIFIC INC.
Gebruder Hischmann Maschinenfabrik
HARDINGE CO. INC.
Kennametal, Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
MINE & SMELTER SUPPLY CO.
Pacific States Steel Corp.
SKF Hellefors Jernverk
Sheffield Div., Armco Steel Corp.
United States Steel Corp., Columbia-Geneva Div.
Youngstown Sheet & Tube Co., The

Tube Mills

Dravo Corp.
Eimco Corp.
Gebruder Hischmann Maschinenfabrik
HARDINGE CO. INC.
Hirsch Brothers Machinery Co., Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LAKE SHORE, INC.
MARCY—see MINE & SMELTER SUPPLY CO., INC.
MINE & SMELTER SUPPLY CO.
NORDBERG MFG. CO.
Reynolds-French & Co.
F. L. SMIDTH & CO.
Straub Mfg. Co., Inc.
Traylor Eng. & Mfg. Co., Div. Fuller Co.

GRIZZLIES

See Screens, Grizzlies and Accessories

GROUTING

See also Concreting Equipment

Equipment

AIR PLACEMENT EQUIP. CO.
AIR PLACO—see AIR PLACEMENT EQUIP. CO.
AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICAL DEPT.
Carey Mfg. Co., The Philip
Cement Gun Co.
CHICAGO PNEUMATIC TOOL CO.
Christensen Diamond Products Co.
DIAMOND DRILL CONTRACTING CO.
Drilling Accessory & Mfg. Co. Inc.
GARDNER-DENVER CO.
Goodrich Industrial Products Co., B. F.
Koehring Co.
LONGYEAR CO., E. J.
Mayo Tunnel & Mine Equipment
Mobile Drilling Inc.
MCCLINTOCK CO. R. S.
MORSE BROS. MACHINERY CO.
Pennsylvania Drilling Co., Penndrill Div.
Ridley Co.
SPRAGUE & HENWOOD INC.
Thor Power Tool Co.

Services

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICAL DEPT.
COWIN & CO. INC.
DIAMOND DRILL CONTRACTING CO.
Dravo Corp.
Geodynamics, Inc.
JOY MANUFACTURING CO.
LONGYEAR CO., E. J.
MCCLINTOCK CO. R. S.
Mobile Drilling Inc.

HARD FACING

See Welding Equipment and Supplies

HATS

See Safety Equipment

HAULAGE UNITS, OFF-RAIL

See also Truck and Trailers; Self Loading Transport; Shuttle Cars
Allis-Chalmers Mfg. Co., Const. Machy. Div.
Athey Products Corp.
Curtiss-Wright Corp., South Bend Div.
Differential Steel Car Co.
Easton Car & Construction Co.
EIMCO Corp.
Ford Motor Co., Ford Div.
Four Wheel Drive Auto Co., The
Fruehauf Trailer Co.
Galion Allsteel Body Co.
Gar Wood Industries Inc.
GENERAL MOTORS CORP., EUCLID DIV.
GETMAN BROTHERS MFG. CO.
Goodman Manufacturing Co.
Howe Scale Co.
International Harvester Co.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
K-W Dart Truck Co.
Koehring Co.
Landis Steel Co.
Le Tourneau-Westinghouse Co.
M-R-S Manufacturing Co.
National Mine Service Co.
Napco Industries, Inc.
Ortruc, Inc.
Sanford-Day Iron Works, Inc.
SCOOT-CRETE—see GETMAN BROS. MFG. DIV., INC.
Tournapull—see Le Tourneau-Westinghouse Co.
Unit Rig & Equipment Co.
WAGNER MINING SCOOP, INC.
Westinghouse Air Brake Co., Le Roi Div.
White Motor Co., Autocar Div.

HEADFRAMES

(Covering only companies cataloging this product)

Steel

Allison Steel Mfg. Co.
Bethlehem Steel Co.
BOYLES BROS. DRILLING CO.
COEUR D'ALENES CO., THE
Hirsch Brothers Machinery Co., Inc.
LAKE SHORE, INC.
Mayo Tunnel & Mining Equipment
NATIONAL IRON CO.
Telluride Iron Works

Timber

North Pacific Lumber Co.

HEATERS

Air

Assoc. Electrical Industries Ltd.
Black, Sivalls & Bryson, Inc.
Carrier Corp.
Foster Wheeler Corp.
General Electric Co., Apparatus Sales Div.
Graybar Electric Co.
Grinnell Co., Inc.
Loesche Hartzerkleinerungs-u. Zementmaschinen K.G.
Mosebach Manufacturing Co.
U. S. Hoffman Machinery Co., Industrial Equipment Divs.
Vulcan Electric Co.
Westinghouse Electric Corp.
Westinghouse Electric Corp., Sturtevant Div.

Space

American Blower Corp.
Bico, Inc.
Carrier Corp.
Dravo Corp.
General Electric Co., Apparatus Sales Div.
GRAYBAR ELECTRIC CO.
Jaeger Machine Co., The
Mosebach Manufacturing Co.
United States Steel Corp.
Westinghouse Electric Corp.

HOIST COMMUNICATIONS

See Communications

HOIST CONTROLS AND SAFETY EQUIPMENT

ACEC
Allis-Chalmers Mfg. Co.
American Chain & Cable Co., Inc., Wright Hoist Div.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Bullard Co., E. D.
English Electric Co. Ltd.
Euclid Electric & Mfg., The
General Electric Co., Apparatus Sales Div.
Hirsch Brothers Machinery Co., Inc.
LILLY—see LOGAN ENGINEERING CO.
LOGAN ENGINEERING CO.
Mine Safety Appliances Co.
Shepard Niles Crane & Hoist Corp.
Simplex—see Logan Engineering Co.
VULCAN IRON WORKS
Westinghouse Electric Corp.

HOISTING CABLE

See Rope, Wire

HOISTING EQUIPMENT

See also Chain Hoists; Rope, Wire

Automatic Skip Loading Devices

ACEC
ALIMAK CORP.
ASEA ELECTRIC INC.
Barker, Davies & Co.
Benoto Inc.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Connellsville Corp.
Demag Aktingesellschaft
Hammermills Inc.
Hirsch Brothers Machinery Co., Inc.
INDUSTRIAL PHYSICS & ELECTRONICS
Jeffrey Mfg. Co.
LAKE SHORE, INC.
Link-Belt Co.
McDowell Co., Inc.
Mitchell Ropeways Ltd.
NATIONAL IRON CO.
Rogers Iron Works Inc.
Shaft & Development Machines, Inc.
Stephens-Adamson Mfg. Co.
VULCAN IRON WORKS CO.

Friction Hoists

ACEC
American Hoist & Derrick Co.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
Barker, Davies & Co.
Clyde Iron Works, Inc.
COEUR D'ALENES CO., THE
Connellsville Corp.
Duff-Norton Co.
EIMCO Corp.
Eisenhutte Prinz Rudolph, AG
English Electric Co. Ltd.
LAKE SHORE, INC.
Mining Progress Inc.
NORDBERG MFG. CO.
Superior-Lidgerwood-Mundy Corp.
Texas Gunlf Sulphur Co.
VULCAN IRON WORKS CO.
Washington Iron Works
John Wood & Sons, Ltd.

Hoist Drum Regrooving

LEBUS INTERNATIONAL ENGINEERS

Mine Shaft Hoists

ACEC
ALIMAK CORP.
ASEA ELECTRIC INC.
Assoc. Electrical Industries Ltd.
ATLAS COPCO INC.
Clyde Iron Works, Inc.
COEUR D'ALENES CO., THE
Connellsville Corp.
Eisenhutte Prinz Rudolph, AG
Electric Controller & Mfg. Co.
English Electric Co. Ltd.
GARDNER-DENVER CO.
Hirsch Brothers Machinery Co., Inc.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
LAKE SHORE, INC.
McDowell Co., Inc.
Mining Progress, Inc.
NORDBERG MFG. CO.
The Nolan Co.
Ohio Hoist & Mfg. Co.
Rogers Iron Works Co.
Shepard Niles Crane & Hoist Corp.
Stearns-Roger Mfg. Co.
Superior-Lidgerwood-Mundy Corp.
Telluride Iron Works
Thor Power Tool Co.
VULCAN-DENVER—see VULCAN IRON WORKS
VULCAN IRON WORKS CO.
Washington Iron Works
Western Gear Corp.
Yuba Consolidated Industries, Inc.

Scraper Hoists (slushers)—Portable

ACEC
American Chain & Cable Co., Inc., Wright Hoist Div.
American Hoist & Derrick Co.
ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Clyde Iron Works
Eimco Corp.
GARDNER-DENVER CO.
Gripholst, Inc.
HARNISCHFEGER CORP.
Ingersoll-Rand Co.
JOY MANUFACTURING CO.
LAKE SHORE, INC.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Landis Steel Co.
Ledeen Mfg. Co.
Lug-All Co., The
Mixermobile Mfg. Inc.
National Supply Co. (Pa.)
Ohio Hoist & Mfg. Co.
Round Chain Co's
SALA MASKINFABRIKS AB
Sanford-Day Iron Works
Shepard Niles Crane & Hoist Corp.
Thor Power Tool Co.
Uhrden, Inc.
VULCAN IRON WORKS CO.

Scraper Hoists (slushers)—Stationary

American Chain & Cable Co., Inc., Wright Hoist Div.
American Hoist & Derrick Co., Inc.
ATLAS COPCO INC.
Beebe Bros.
Connellsville Corp.
Clyde Iron Works, Inc.
Eisenhutte Prinz Rudolph AG
GARDNER-DENVER CO.
Gar Wood Industries, Inc.
HARNISCHFEGER CORP.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
LAKE SHORE, INC.
NATIONAL IRON CO.
National Supply Co. (Pa.)
Ohio Hoist & Mfg. Co.
Round Chain Co's
Sanford-Day Iron Works
Sauerman Bros., Inc.
Shepard Niles Crane & Hoist Corp.
Stearns-Roger Mfg. Co.
VULCAN IRON WORKS CO.
Washington Iron Works

Skips and Cages

Allison Steel Mfg. Co.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
ASEA Electric Inc.
Atlas Car & Mfg. Co., The
Barker, Davies & Co.
CARD IRON WORKS CO., THE C. S.
Clyde Iron Works, Inc.
COEUR D'ALENES CO., THE
Connellsville Corp.
Demag Aktiengesellschaft
Easton Car & Construction Co.
Hammermills Inc.
Hirsch Brothers Machinery Co., Inc.
Jeffrey Mfg. Co.
JETO-SKIP—see LAKE SHORE, INC.
LAKE SHORE, INC.
MACHINERY CENTER INC.
Mayo Tunnel & Mine Equipment
McDowell Co., Inc.
NATIONAL IRON CO.
Nolan Co., The
NORDBERG MFG. CO.
Ohio Hoist & Mfg. Co.
Rogers Iron Works Co.
Sanford-Day Iron Works Inc.
Stearns-Roger Mfg. Co.
Stephens-Adamson Mfg. Co.
Universal Dredge Mfg. Co.
VULCAN IRON WORKS
Wellman Engineering Co., The
Yale & Towne Mfg. Co., The Yale Materials Handling Div.

HOSE

Air Reduction Sales Co.
American Biltrite Rubber Co., Boston Woven Hose and Rubber Div.
American Rubber Mfg. Co., The
ATLAS COPCO INC.
Band-it Co.
Bonded Scale & Machine Co.
Buck & Associates, Carl
Carlyle Rubber Co., Inc.
CHICAGO PNEUMATIC TOOL CO.
Davey Compressor Co.
Drilling Accessory & Mfg. Co. Inc.
EIMCO Corp.
Flexaust Co.
Gates Rubber Co., The
GOODALL RUBBER CO.
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co.
HEWITT-ROBINS
Industrial Air Prod. Co.
INGERSOLL-RAND CO.
James Equipment Inc.
JOY MANUFACTURING CO.
Lee Rubber & Tire Corp., Republic Rubber Div.
LINATEX CORP. OF AMERICA
Lincoln Engineering Co. Div., McNeil Machine & Engr. Co.
Olin Mathieson Chemical Corp.
MINE SAFETY APPLIANCES CO.
NATIONAL MINE SERVICE CO.
Porter Co., Inc., H. K., Thermoid Div.
Raybestos-Manhattan, Inc.
Stenberg Corp. of Canada Ltd.
Stewart-Warner Corp., Alemite Div.
Stratoflex, Inc.
Tamping Bag Co., Div. Pickard Industries, Inc.
Thor Power Tool Co.
United States Rubber Co.
Westinghouse Air Brake Co., Le Roi Div.

HOSE FITTINGS, CLAMPS, COUPLINGS

American Biltrite Rubber Co., Inc., Boston Woven Hose & Rubber Div.
American Rubber Mfg. Co., The
Band-it Co.
Carlyle Rubber Co., Inc.
Chase Brass & Copper Co.
CHICAGO PNEUMATIC TOOL CO.
Drilling Accessory & Mfg. Co., Inc.
Eastern Malleable Iron Co., Eastern Sales Co. Div.
Gates Rubber Co., The
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co.
HEWITT-ROBINS
Hose Accessories
INGERSOLL-RAND CO.
Lee Rubber & Tire Corp., Republic Rubber Div.
Lincoln Engineering Co. Div., McNeil Machine & Engr. Co.
MINE SAFETY APPLIANCES CO.
National Mine Service Co.
Porter Co., Inc., H. K., Thermoid Div.
Solar Aircraft Co.
Stewart-Warner Corp., Alemite Div.
Stratoflex, Inc.
Thor Power Tool Co.
Victaulic Co. of America

HYDROSEPARATORS

See Thickeners and Tanks; Classifiers

IDLERS

See Conveyor Equipment

INCREASERS, SPEED

See Speed Changers

INSTRUMENTS

See Engineering Supplies; Surveying Instruments; Controls

ION EXCHANGE RESINS

See Reagents and Chemicals

JACKS

Blackhawk Industrial Div.
Dowty Mining Equipment Ltd.
Eaton Manufacturing Co., Cleveland Worm & Gear Div.
National Mine Service Co.
Porter Co. Inc., H. K.
Porter Co. Inc., H. K., Forge & Fittings Div.

JIGS

See Concentrating Equipment

JIM CROWS

See Track and Accessories

JUMBOS

See Drills, Rock

KILNS

See Dryers and Kilns; Coolers; Pyrometallurgical Equipment

LABORATORIES AND ASSAYERS

See also Ore Testing Services
ARIZONA TESTING LABORATORIES
Beckman Instruments, Inc., Scientific Instruments Div.
Bico, Inc.
Black & Deason
Booth Co., Inc.
Braun Chemical Co.
Carpco Mfg. Inc.
Central Scientific Co.
CHAPMAN, WOOD & GRISWOLD
COLORADO ASSAYING CO., THE
Custom Assay Office
Beggendorfer, T. G.
DENVER EQUIPMENT CO.
Dickinson Laboratories, Inc.
El Paso Testing Labs. Ltd.
Galigher Co., The
Goodall Brothers, Assayers
HANKS, INC., ABBOTT A.
Hawley & Hawley, Assayers & Chemists Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
Ledoux & Co. Inc.
Lerch Bros., Inc.
Mace Co., The
Menlo Research Lab.
Minerals Engineering Co.
Mobile Drilling Inc.
Nichols Laboratories, Inc.
Nybergs Mek. Verkstad, Edvard
Osborne Laboratories, Inc., Raymond G.
Philips Electronics, Inc., Instruments Div.
Pioneer Geochemical Surveys Inc.
REED ENGINEERING
Smith-Emery Co.
SOUTHWESTERN ENGINEERING CO.
Stearns Magnetic Products Div., The Indiana General Corp.
W. H. Stowell & Co.
STURTEVANT MILL CO.
WESTERN MACHINERY CO., WEMCO DIV.
WOOD ASSAYING CO., THE HENRY E.

LABORATORY EQUIPMENT AND SUPPLIES

See also Reagents and Chemicals

Laboratory and Testing Machines

Ainsworth & Sons, Inc., Wm.
Analytical Measurements Inc.
Assoc. Electrical Industries Ltd.
Atkins Technical Inc.
BALDWIN-LIMA-HAMILTON CORP.
Bausch & Lomb
Beckman Instruments, Inc., Scientific Instruments Div.
Bico, Inc.
Booth Co., Inc., The
BOULDER SCIENTIFIC CO.
Carpco Mfg., Inc.
Central Scientific Co. of Calif.
DENVER EQUIPMENT CO.
DFC—see Denver Fire Clay Co., The
Dickinson Laboratories, Inc.
Dings Magnetic Separator Co.
Frantz Co., Inc., S. G.
Galigher Co., The
General Electric Co., Apparatus Sales Div.
General Mach. Co.
HARDINGE CO. INC.
Haver & Boecker
Humphreys Engineering Co.
Ledoux & Co.
Leeds & Northrup Co.
Liquid-Solid Separations Ltd.
Magnetic Engineering & Mfg. Co.
Martindale Electric Co.
MASSCO—see MINE & SMELTER SUPPLY CO.
Menlo Research Laboratory
MINE & SMELTER SUPPLY CO.
Morgardshammars Mek. Verkstads AB
Morse Bros. Machinery Co.
Nucleonics Corp. of America
Philips Electronic Instruments
Pulva Corp.
Pyrometer Instrument Co. Inc.
Ro-Tap—see Tyler Co., The W. S.
SOUTHWESTERN ENGINEERING CO.
Staplex Co., The
Stearns Magnetic Products Div., The Indiana General Corp.
STURTEVANT MILL CO.
Ty-Lab—see Tyler Co., The W. S.
Tyler Co., The W. S.
Universal Vibrating Screen Co.
Uranium Instrument Co.
Van Waters & Rogers, Inc., Braun Chemical Div.
Van Waters & Rogers, Inc., Braun-Knecht-Heimann Co. Div.
WESTERN MACHINERY CO., WEMCO DIV.
Wheel Truing Tool Co.

Miscellaneous Laboratory Supplies

Ainsworth & Sons, Inc., Wm.
Allied Chemical Corp., General Chem. Div.
Atkins Technical, Inc.
Bausch & Lomb
Bico, Inc.
Booth Co., Inc., The
Carpco Mfg., Inc.
Carrier Corp.
Central Scientific Co. of Calif.
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
Denver Fire Clay Co.
Fischer & Porter Co.
Greening & Sons Ltd., N.
GRUENDLER CRUSHER & PULVERIZER CO.
INDUSTRIAL PHYSICS & ELEC. TRONICS CO.
Lerch Brothers Inc.
Lerlab Supply Co.
Live Roller Mills Mfg. Co.
Matheson Co. Inc., The
Menlo Research Lab.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Nucleonic Corp. of America
Pioneer Geochemical Surveys Inc.
STURTEVANT MILL CO.
Tyler Co., The W. S.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann Co. Div.

LACING, BELT

See Fasteners, Belt

LAMPS, MINER

See Safety Equipment

LIGHT PLANTS

See Electrical Equipment

LINERS

See Grinding Equipment

LOADERS, FRONT END AND OVERHEAD, AND FORK

See also Tractors and Attachments; Self-Loading Transport; Train Loader Systems

Crawler

Allis-Chalmers Mfg. Co., Const. Machy. Div.
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
American Tractor Equipment Corp.
ATLAS COPCO, INC.
AUSTIN-WESTERN—see BALDWIN-LIMA-HAMILTON CORP.
BALDWIN-LIMA-HAMILTON CORP.
Barber-Greene Co.
Caterpillar Tractor Co.
John Deere
Drott Manufacturing Co.
EIMCO Corp.
Goodman Manufacturing Co.
HARNISCHFEGER CORP.
Hough Co., The Frank G.
International Harvester Co.
Jeffrey Mfg. Co.
Joost Manufacturing Co.
JOY MANUFACTURING CO.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Koehring Co.

Landis Steel Co.
MARION POWER SHOVEL CO.
Minneapolis-Moline Co.
Oliver Corp., The
Rogers Iron Works Co.
Sanford-Day Iron Works
Thor Power Tool Co.
Tractomotive Corp.
Traxcavator—see Caterpillar Tractor Co.
Washington Iron Works

Fork Lift

Allis-Chalmers Mfg. Co., Engine Materials Handling Div.
EIMCO Corp.
Hough Co., The Frank G.
Koehring Co.
Koehring Co., Kwik-Mix Co. Div.
Pettibone Mulliken Corp.
Yale & Towne Mfg. Co., The, Yale Material Handling Div.

Gathering Arm

Goodman Manufacturing Co.
International Harvester Co.
Jeffrey Mfg. Co., The
JOY MANUFACTURING CO.

Rail (Mucking Machines)

AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.
AMSCO—see American Brake Shoe Co.
ATLAS COPCO INC.
BALDWIN-LIMA-HAMILTON CORP.
EIMCO Corp.
GARDNER-DENVER CO.
Goodman Manufacturing Co.
Sanford-Day Iron Works, Inc.

Rubber-Tired

Allis-Chalmers Mfg. Co., Industries Group
American M.A.N. Corp.
Athey Products Corp.
ATLAS COPCO INC.
AUSTIN-WESTERN—see BALDWIN-LIMA-HAMILTON CORP.
Barber-Greene Co.
Benoto Inc.
Caterpillar Tractor Co.
Clark Equipment Co.
Consolidated Metal Products Inc.
John Deere
Eagle Crusher Co. Inc.
GENERAL MOTORS CORP., EUCLID DIV.
Goodman Manufacturing Co.
Hough Co., The Frank G.
International Harvester Co.
Jaeger Machine Co., The
Jeffrey Mfg. Co., The
Koehring Co.
Koehring Co., Kwik-Mix Co. Div.
Michigan—see Clark Equipment Co.
Minneapolis-Moline Co.
Mixermobile Mfrs. Inc.
Napco Industries, Inc.
NATIONAL IRON CO.
Oliver Corp., The
Pettibone Mulliken Corp.
Rogers Iron Works Co.
Sanford-Day Iron Works, Inc.
SOUTHWEST ENGINEERING CO.
Thew Shovel Co., The
Tractomotive Corp.
Washington Iron Works
Westfall Equipment
Westinghouse Air Brake Co.
Yale-Towne Mfg. Co., Yale Materials Handling Div.

LOCOMOTIVES

Battery

ACEC
Assoc. Electrical Industries Ltd.
Atlas Car & Mfg. Co., The
BALDWIN-LIMA-HAMILTON CORP.
English Electric Co. Ltd.
General Electric Co., Apparatus Sales Div.
General Electric Locomotive Div.
Goodman Manufacturing Co., Mancha Storage Battery Locomotive Div.
Jeffrey Mfg. Co.
Mayo Tunnel & Mine Equipment
National Mine Service Co.

Compressed Air

Atlas Car & Mfg. Co., The
Demag Aktiengesellschaft
EIMCO Corp.
Hack Engineering Co.
Mayo Tunnel & Mine Equip.
Tramaire—see Hack Eng. Co.

Diesel

American Locomotive Co.
American M.A.N. Corp.
English Electric Co. Ltd.
Fairbanks, Morse & Co.
Fate-Root-Heath Co., The, Plymouth Locomotive Works Div.
General Electric Co.
General Motors Corp., Electro-Motive Div.
Goodman Manufacturing Co., Mancha Storage Battery Locomotive Div.
Greensburg Mach. Co.
Hack Eng. Co.
Hudson, Ltd., Robert
KLOECKNER HUMBOLDT DEUTZ AG—DIESEL ENERGY CORP.
Le Tourneau-Westinghouse Co.
Mayo Tunnel & Mine Equipment
National Mine Service Co.
Rogers Iron Works Co.
Ruth Co., The
Switchmobile—see Le Tourneau-Westinghouse Co.
Universal Dredge Mfg. Co.

Diesel-Electric

ACEC
Alco Products, Inc.
American Locomotive Co.
Assoc. Electrical Industries Ltd.
Atlas Car & Mfg. Co., The
Baldwin-Lima-Hamilton Corp., Eddystone Div.
Differential Steel Car Co.
English Electric Co. Ltd.
Fairbanks, Morse & Co.
Fate-Root-Heath Co., The, Plymouth Locomotive Works Div.
General Electric Co., Apparatus Sales Div.
General Motors Corp., Electro-Motive Div.
Greensburg Machine Co.
Hack Engineering Co.
National Mine Service Co.
Rogers Iron Works Co.

Trolley

ACEC
Atlas Car & Mfg. Co.
Differential Steel Car Co.
English Electric Co. Ltd.
General Electric Co., Apparatus Sales Div.
Goodman Manufacturing Co.
Goodman Manufacturing Co., Mancha Storage Battery Locomotive Div.
Goodrich Industrial Prods. Co., B. F.
Jeffrey Mfg. Co.
National Mine Service Co.
Vulcan Iron Works (Pa.)

LOG WASHERS

See Washers

LUBRICANTS

Calol—see Standard Oil Co. of Calif.
Climax Molybdenum Co.
Drullard Co., Howard
Esso-Standard Oil Co.
Fluidwick Co.
General Petroleum Corp.
Gulf Oil Corp., Dept. D.M.
Houghton & Co., E. F.
Imperial Oil & Grease Co. Inc.
Jet-Lube Inc.
Keystone Lubricating Co.
Kopr-Kote—see Jet-Lube Inc.
Keystone Lubricating Co.
Monsanto Chemical Co.
Morocco—see Sahara Oil Co.
Rockwell Manufacturing Co.
RPM—see Standard Oil Co. of Calif.
Sahara Oil Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co.
Standard Oil Co. of California
Standard Oil Co. (Indiana)
Stewart-Warner Corp., Alemite Div.
Texas Co.
Thor Power Tool Co.
Tide Water Associated Oil Co.
Union Oil of California

LUBRICATING SYSTEM

Dravo Corp.
Eaton Manufacturing Co., Farval Div.
Keystone Lubricating Co.
Lincoln Engineering Co. Div., McNeil Machine & Engineering Co.
Stewart-Warner Corp., Alemite Div.
Trico Fuse Mfg. Co.

MAGNETIC EQUIPMENT

Detectors

Crucible Steel Co. of America
Dings Magnetic Separator Co.
General Electric Co., Apparatus Sales Division
INDUSTRIAL PHYSICS & ELECTRONICS COMPANY
Magnetic Engineering & Mfg. Co.
Stearns Magnetic Products Div., The Indiana General Corp.

Head Pulleys and Suspension Magnets

Carpco Mfg. Inc.
Crucible Steel Co. of America
Dings Magnetic Separator Co.
Eriez Manufacturing Co.
Homer Mfg. Co., Div., Ohio Electric Mfg. Co., The
Johnson, Herbert B.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Magnetic Eng. & Mfg. Co.
Scott-Concentrators
Stearns Magnetic Products Div., Indiana General Corp.

Separators

Carpco Mfg. Co.
Crucible Steel Co. of America
Dings Magnetic Separator Co.
Eriez Manufacturing Co.
Exalon Co., The
Frantz Co., Inc., S. G.
General Electric Co., Metallurgical Products Dept.
Homer Mfg. Co. Div., Ohio Electric Mfg. Co., The
Infilco, Inc.
Jeffrey Mfg. Co.
Johnson, Herbert Banks
JOY MANUFACTURING CO.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LURGI GmbH
Mace Co., The
Magnetic Engineering & Mfg. Co.
Research-Cottrell, Inc.
Sanford-Day Iron Works, Inc.
Scott-Concentrators
Square D Co., EC & M Div.
Stearns Magnetic Products Div., The Indiana General Corp.

METERS AND GAUGES

Assoc. Electrical Industries Ltd.
B-I-F Industries Inc.
Bailey Meter Co.
Daystrom Inc., Weston Instruments Div.
English Electric Co. Ltd.
Esterline Angus Instrument Co. Inc.
Fielden Electronics Ltd.
Fischer & Porter Co.
Foxboro Co., The
General Electric Co., Apparatus Sales Div.
Infilco Inc.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Nuclear-Chicago Corp.
Pyrometer Instrument Co. Inc., The
Rockwell Manufacturing Co.
Westinghouse Electric Corp.

MILL DESIGN

See Plant Design and Construction

MINE CARS

See Cars, Mine

MINE SAFETY EQUIPMENT

See Safety Equipment

MINE SUPPORT

See also Timber

Hydraulic Props

Bethlehem Steel

MONITORS (HYDRAULIC)

Hydraulic Supply Mfg. Co.
Intelli-Giant—see J. W. Stang Co.
Stang, J. W.
Yuba Mining Div., Yuba Consolidated Industries, Inc.

MOTORS

See also Engines; Electrical Equipment; Locomotives

Air Motors

ALIMAK CORP.
ATLAS COPCO, INC.
CHICAGO PNEUMATIC TOOL CO.
Coppus Engineering Corp.
Demag Aktiengesellschaft
EIMCO Corp.
GARDNER-DENVER CO.
Graybar Electric Co., Inc.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Ledeen Mfg. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Mining Progress, Inc.
PISTONAIR—see JOY MFG. CO.
H. K. Porter Co., Inc., Forge & Fittings Div.
Thor Power Tool Co.
TURBINAIR—see JOY MFG. CO.
Westinghouse Air Brake Co., Le Roi Div.

Gear Motors

Louis Allis Co.
Allis-Chalmers Mfg. Co., Industries Group
Assoc. Electrical Industries Ltd.
COEUR D'ALENES CO., THE
Conveyor Co., The
Dowty Mining Equipment Ltd.
Eaton Manufacturing Co., Dynamatic Div.
EIMCO Corp.
English Electric Co. Ltd.
Fairbanks, Morse & Co.
Falk Corp., The
Foote Co.
General Dynamics Corp., Electro Dynamic Div.
General Electric Co., Apparatus Sales Div.
General Motors Corp., Delco Products Div.
Graybar Electric Co., Inc.
Hathaway Instruments, Inc.—Sterling Electric Motors, Inc.
HEWITT-ROBINS
Howell Electric Motors Co.
Lima Electric Motor Co., The
Link-Belt Co.
Live Roller Mills Mfg. Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Morse Chain Co.
Philadelphia Gear Works, Inc.
Reliance Electric & Engineering Co.
U.S. Electrical Motors, Inc.
Western Gear Corp. (Calif.)
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Electric Corp.

Hydraulic Motors

American Brake Shoe Co.
Commercial Shearing & Stamping Co.
Dowty Mining Equipment Ltd.
Rockwell Manufacturing Co.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

MUCKING MACHINES

See Loaders; Shaft Sinking Equipment

NODULIZING

See Pelletizers and Nodulizers

NOZZLES

See Screens, Grizzlies and Accessories

OILERS, AIR LINE

ALIMAK CORP.
ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Cleveland Vibrator Co.
Davey Compressor Co.
Drullard Co., Howard
EIMCO Corp.
GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Lincoln Engineering Co., Div. McNeil Machine & Engineering Co.
SCHRAMM, INC.
Standard Oil Co. of Calif.
Stewart-Warner Corp., Alemite Div.
Thor Power Tool Co.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.

OILS

See Lubricants; Reagents and Chemicals

OPEN GEARING

See also Gears
Falk Corp., The
HEWITT-ROBINS, INC.
Link-Belt Co.
Ohio Gear Co.
Penn Machine Co.
Tool Steel Gear & Pinion Co.

ORE TESTING SERVICES

See also Laboratories and Assayers
ARIZONA TESTING LABORATORIES
Booth Co., Inc., The
Carpco Mfg. Inc.
CHAPMAN, WOOD & GRISWOLD
Custom Assay Office
DENVER EQUIPMENT CO.
Dickinson Laboratories Inc.
El Paso Testing Labs., Ltd.
Fraser & Chalmers Eng. Works
Galigher Co., The
HANKS, INC., ABBOTT A.
Johnson, Herbert Banks
Kennedy-Van Saun Eng. & Mfg. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Ledoux & Co., Inc.
Lerch Brothers Inc.
McDowell Co., Inc., Dwight Lloyd Div.
Minerals Engineering Co.
Mobile Drilling, Inc.
Nucleonic Corp. of America
Osborne Laboratories, Inc., Raymond G.
Pioneer Geochemical Surveys Inc.
REED ENGINEERING
SOUTHWESTERN ENGINEERING CO.
Stearns Magnetic Products Div., The Indiana General Corp.
W. H. Stowell & Co.
Telluride Iron Works Co.
Tracerlab, Inc.
Twining Laboratories, Inc., The
WESTERN MACHINERY CO., WEMCO DIV.

OXYGEN BREATHING APPARATUS

See Safety Equipment

PACKING

(Covering only companies cataloging this product)
American Biltrite Rubber Co. Inc., Boston Woven Hose & Rubber Div.
Carey Mfg. Co., The Philip
GOODALL RUBBER CO.
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co.
HEWITT-ROBINS INC.
Houghton & Co., E. F.
JOHNS-MANVILLE SALES CORP.
Lee Rubber & Tire Corp., Republic Rubber Div.
Porter Co. Inc., H. K., Thermoid Div.

PELLETIZERS, NODULIZERS & BRIQUETTES

Drum

Gebruder Hischmann Maschinenfabrik
HARDINGE CO., INC., (& PAN)
Kennedy-Van Saun Mfg. & Engr. Co.
Link-Belt Co.
Mace Co., The
Scott-Concentrators
STANDARD STEEL CORP.

Disc

Dravo Corp.
Gebruder Hischmann Maschinenfabrik
LURGI GmbH

PIPE AND FITTINGS

See also Couplings

Asbestos

JOHNS-MANVILLE SALES CORP. (CEMENT)
PACIFIC PIPE CO.
TRANSITE—see JOHNS-MANVILLE
United States Rubber Co.

Cast and Steel

AB Alvenius Industrier
Alco Products, Inc.
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
American Locomotive Co.
Armco Steel Corp., National Supply Div.
ATLAS COPCO INC.
Bethlehem Steel Co.
Calumet & Hecla, Inc., Calumet Div.
Crane Co.
Crucible Steel Co. of America
ESCO Corp.
Grinnell Co.
Hydraulic Supply Mfg. Co.
Kaiser Steel Corp.
Lead Lined Iron Pipe Co.
Mannesmann-Export GmbH
McNally Pittsburgh Co.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
NATIONAL IRON CO.
National Supply Co., The
PACIFIC PIPE CO.
H. K. Porter Co., Inc., Forge & Fittings Div.
Republic Steel Corp.
U. S. Steel Corp., Columbia Geneva Div.
Victaulic Co. of America
Walworth Co.
Youngstown Sheet & Tube Co., The

Copper, Brass and Bronze

Bridgeport Brass Co.
Chase Brass & Copper Co.
Phelps-Dodge Copper Products Corp.
Revere Copper & Brass, Inc.

Plastic

Amercoat Corp.
Barber-Webb Co., Inc.
British Insulated Callender's Cable Ltd.
Carey Mfg. Co., The Philip
Colonial Plastic Mfg. Co., The, Industrial Div.
Crane Co.
Evans Pipe Co., The, Evanite Plastic Co. Div.
Fischer & Porter Co.
Gates Rubber Co., The
GOODALL RUBBER CO.
Goodrich, Industrial Products Co., B. F.
Grinnell Co.
Kraloy—CH Emtrol Co.
Mannesmann Export GmbH
Minnesota Mining & Mfg. Co., Irvington Varnish & Insulator, a Div.
National Tank & Pipe Co.
PACIFIC PIPE CO.
H. K. Porter Co., Inc.
Republic Steel Corp.
Ryerson & Son, Inc., Joseph T.
United States Rubber Co.
U. S. Steel Corp., Columbia-Geneva Div.
Victaulic Co. of America
Walworth Co.
Youngstown Sheet & Tube Co., The

Rubber Lined

AB Alvenius Industrier
Barber-Webb Co., Inc.
Crane Co.
Galigher Co., The
Gates Rubber Co., The
GOODALL RUBBER CO.
Goodrich Industrial Products Co., B. F.
Goodyear Tire & Rubber Co.
LINATEX CORP. OF AMERICA
NAYLOR PIPE CO.
PACIFIC PIPE CO.
H. K. Porter Co., Inc.
Raybestos-Manhattan, Inc.
United States Rubber Co.
Victaulic Co. of America
Wilkinson Rubber Linatex Ltd.

Steel, Spiral-Welded

AB Alvenius Industrier
Armco Steel Corp., National Supply Div.
Hydraulic Supply Mfg. Co.
Lead Lined Iron Pipe Co.
Mannesmann-Export GmbH
NAYLOR PIPE CO.
PACIFIC PIPE CO.
U. S. Steel Corp.

Valves—See Valves

Wood

National Tank & Pipe Co.
PACIFIC PIPE CO.
Simpson Engineered Wood Prods. Co., National Tank & Pipe Dept.
Windeler Co., Ltd., George

PLANT DESIGN AND CONSTRUCTION

Allen & Garcia Co.
Allison Steel Mfg. Co.
Aluminum Co. of America
BALDWIN-LIMA-HAMILTON CORP.
Barber-Greene Co.
Baukol, Philip J.
Booth Co. Inc., The
Braun & Co., C. F.
Carpco Mfg. Inc.
CHAPMAN, WOOD & GRISWOLD
COWIN & CO., INC.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
Dravo Corp.
Eagle Crusher Co. Inc.
Eimco Corp., The
Fisher Contracting Co.
Foster Wheeler Corp.
Galigher Co., The
Gebruder Hischmann Maschinenfabrik
Gould & Co., Gordon I.
Hack Engineering Co.
HEWITT-ROBINS INC.
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co., Inc.
Kaiser Engineers
C. P. Keagle, Engineers
Kellogg Company, The M. W.
Kennedy-Van Saun Mfg. Eng. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Koppers Co., Inc.
Link-Belt Co.
Live Roller Mills Mfg. Co.
Loesche Hartzerkleinerungs-u. Zementmaschinen K.G.
LOEWY-HYDROPRESS—see BALDWIN-LIMA-HAMILTON CORP.
LONGYEAR CO., E. J.
LURGI GmbH
Mace Co., The
Maya Tunnel & Mine Equip.
McDowell Co., Inc.
McNally Pittsburgh Mfg. Corp.
Meissner Engineers, Inc.
Menlo Research Laboratory
Minerals Engineering Co.
NATIONAL IRON CO.
Nichols Engineering & Research Corp.
Osborne Laboratories Inc., Raymond G.
Osmose Wood Preserving Co. of America, Inc.
Poor & Co., Inc., Pioneer Eng. Div.
RAMSEY ENGINEERING CO.
Roberts & Schaefer Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
STANDARD STEEL CORP.
Stearns-Roger Mfg. Co., The
STILL & STILL
Telluride Iron Works Co.
TREADWELL CO., INC., M. H.
U. S. Steel Corp.
Universal Dredge Mfg. Co.
Walvoord, Inc., O. W.
Western Knapp Engineering Co.
WESTERN MACHINERY CO.
WISSER & COX
World Mining Consultants, Inc.
Yuba Consolidated Industries, Inc.

PNEUMATIC CONCRETE PLACING

AIR PLACEMENT EQUIP. CO.
Cement Gun Co.
CHICAGO PNEUMATIC TOOL CO.
Eimco Corp., The
Gunite—see Cement Gun Co.
Holman Bros. Ltd.
Maya Tunnel & Mine Equipment
Zimmerman Manufacturing Co.

PNEUMATIC TOOLS

See Tools, Air Driven

PROPS

Hydraulic

Dowty Mining Equipment Ltd.
Mining Progress, Inc.

Self Advancing

Dowty Mining Equipment Ltd.
Mining Progress, Inc.

POWDER

See Blasting Supplies

PRESERVATIVES

See Reagents and Chemicals

PROSPECTING EQUIPMENT

See Exploration Equipment

PULLEYS

See also Magnetic Equipment
AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.
AMSCO—see AMERICAN BRAKE SHOE CO.
Bonded Scale & Machine Co.
Chain Belt Co.
Continental Conveyor & Equipment Co.
Dings Magnetic Separator Co.
Dodge Manufacturing Co.
Eisenhutte, Prinz Rudolph AB
Eriez Manufacturing Co.
Gates Rubber Co., The
General Motors Corp., New Departure Div.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
Link-Belt Co.
Lippmann Engineering Works, Inc.
Magnetic Eng. & Mfg. Co.
NATIONAL IRON CO.
Sanford-Day Iron Works Inc.
SKOOKUM CO., INC., THE
Stearns Magnetic Products Div., The Indiana General Corp.
Stephens-Adamson Mfg. Co.
Telluride Iron Works Co.
Texas Gulf Sulphur Co.
Western Gear Works
Wood & Sons Ltd., John
Worthington Corp.
Yuba Mining Co.

PULVERIZERS

See also Crushers; Grinding Equipment; Laboratory Supplies

Allis-Chalmers Mfg. Co.
Bethlehem Steel Co.
Bico Inc.
Combustion Engineering Inc., Raymond Div.
DENVER EQUIPMENT CO.
Denver Fire Clay Co.
Eagle Crusher Co. Inc.
Foster Wheeler Corp.
General Electric Co.
GRUENDLER CRUSHER & PULVERIZER CO.
HARDINGE CO., INC.
HAZEMAG USA, INC.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Engr. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Lippmann Engineering Works Inc.
Loesche Hartzerkleinerungs-u. Zementmaschinen K.G.
Majac Inc.
MINE & SMELTER SUPPLY CO.

Nybergs Mek. Verkstad, Edvard
Pulva Corp.
SMIDTH & CO., F. L.
SOUTHWESTERN ENGINEERING CO.
STURTEVANT MILL CO.
Universal Engineering Corp.
Universal Road Machinery Co.
Williams Patent Crusher & Pulv. Co.

PUMPS

Acid

ALLEN-SHERMAN-HOFF PUMP CO., THE
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO.
AMPCO Metal, Inc.
AMSCO—see AMERICAN BRAKE SHOE CO.
B-I-F Industries Inc.
Barrett, Haentjens & Co.
Buck & Associates, Carl
Byron Jackson Pumps, Inc.
CENTRISEAL—see THE ALLEN-SHERMAN-HOFF PUMP CO.
DENVER EQUIPMENT CO.
Denver Fire Clay Co.
DORR-OLIVER INC.
Duriron Co. Inc., The
ESCO Corp.
Fairbanks, Morse & Co.
Flygt Corp.
Food Machinery & Chemical Corp., Peerless Pump Div.
Galigher Co., The
GARDNER-DENVER CO.
Hazelton—see Barrett, Haentjens & Co.
HYDROSEAL—see THE ALLEN-SHERMAN-HOFF PUMP CO.
INGERSOLL-RAND CO.
Jaeger Machine Co., The
KSB, Klein, Schanzlin & Becker AG
Kraloy-CH Emtrol Co.
LaBour Co. Inc., The
Marlow Pumps—Div. of Bell & Gossett Co.
Mission Manufacturing Co.
Morris Machine Works
NAGLE PUMPS, INC.
New York Air Brake Co., The, Aurora Pump Div.
OLIVITE—see DORR-OLIVER, INC.
Rice Pump & Machine Co.
Robbins & Myers, Inc.
Textron Inc., Homelite Div.
Union Carbide Corp., National Carbon Co. Div.
WESTERN MACHINERY CO.
WILFLEY & SONS, INC., A. R.
Worthington Corp.

Air-Driven

ACKER DRILL CO., INC.
ATLAS COPCO INC.
Barrett, Haentjens & Co.
Bryon Jackson Pumps, Inc.
CHICAGO PNEUMATIC TOOL CO.
GARDNER-DENVER CO.
Hazelton—see Barrett, Haentjens & Co.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
Ledeen Inc.
Lincoln Engineering Co. Div., McNeil Machine & Engr. Co.
Marlow Pumps, Div. of Bell & Gossett Co.
Porter Co. Inc., H. K., Forge & Fittings Div.
SCHRAMM, INC.
Stewart-Warner Corp., Alemite Div.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.

Diaphragm

B-I-F Industries Inc.
Chain Belt Co.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
GARDNER-DENVER CO.
Gorman-Rupp Co., The
HARDINGE CO. INC.
Jaeger Machine Co., The
Layton Co. Inc.
LINATEX CORP. OF AMERICA
Marlow Pumps Div., Bell & Gossett Co.
Rice Pump & Machine Co.
R. O. Stokes & Co., Ltd.
Textron Inc., Homelite Div.
WESTERN MACHINERY CO.
Wilkinson Rubber Linatex Ltd.

High Pressure

ACEC
ACKER DRILL CO. INC.
ALLEN-SHERMAN-HOFF PUMP CO
Armco Steel Corp., National Supply Div.
Barrett, Haentjens & Co.
Blackhawk Industrial Div.
Byron Jackson Pumps Inc.
Deming Co., The
Failing Co., George E.
Fairbanks, Morse & Co.
FOOD MACHINERY & CHEMICAL CORP., JOHN BEAN DIV.
GARDNER-DENVER CO.
Gorman-Rupp Co., The
Jaeger Machine Co., The
Lincoln Engineering Co. Div., McNeil Machine & Engr. Co.
Marlow Pumps Div., Bell & Gossett Co.
National Supply Co. (Pa.)
New York Air Brake Co., The Aurora Div.
Pennsylvania Drilling Co., Penndrill Mfg. Co.
Porter Co. Inc., H. K., Forge & Fittings Div.
Stewart-Warner Co., Alemite Div.
Textron Inc., Homelite Div.

Mine and Deep Well

ALLEN-SHERMAN-HOFF PUMP CO., THE
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO., AMER. MANGANESE STEEL DIV.
American M.A.N. Corp.
AMSCO—see AMERICAN BRAKE SHOE CO.
Armco Steel Corp., National Supply Div.
Barrett, Haentjens & Co.
Byron Jackson Pumps, Inc.
CHICAGO PNEUMATIC TOOL CO.
Deming Co., The
Fairbanks, Morse & Co.
FOOD MACHINERY & CHEM. CORP., JOHN BEAN DIV.
Flygt Corp.
GARDNER-DENVER CO.
Gorman-Rupp Co., The
Hazelton & Pleuger—see Barrett, Haentgens & Co.
INGERSOLL-RAND CO.
Jaeger Machine Co., The
Johnston Pump Co.
KSB, Klein, Schanzlin & Becker AG
La Bour Co., Inc., The
Marlow Pumps, Div. of Bell & Gossett Co.
Mission Manufacturing Co.
Morris Machine Works
Motoramic Inc.
NAGLE PUMPS INC.
National Supply Co. (Pa.).
New York Air Brake Co., The Aurora Pump Div.
Pettibone-Mulliken Corp.
Pleuger Unterwasserpumpen GmbH
Rice Pump & Mach. Co.
Sanford-Day Iron Works
Stanco Mfgs. & Sales, Inc.
Standard Elec. Mfg. Co., Inc.
Worthington Corp.

Piston

ACKER DRILL CO., INC.
Deming Co., The
Dowty Mining Equipment Ltd.
Failing Co., Geo. E.
Fairbanks, Morse & Co.
FOOD MACHINERY & CHEM. CORP., JOHN BEAN DIV.
GARDNER-DENVER CO.
Ledeen Inc.
Reynolds-French & Co.
Sanford-Day Iron Works, Inc.

Sand and Slime

ALLEN-SHERMAN-HOFF PUMP CO., THE
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO.
Barrett, Haentjens & Co.
Carpco Mfg. Inc.
CENTRISEAL—see THE ALLEN-SHERMAN-HOFF PUMP CO.
CHICAGO PNEUMATIC TOOL CO.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
Erie Pump & Engine Works
Failing Co., Geo. E.
Flygt Corp.
FOOD MACHINERY & CHEM. CORP., JOHN BEAN DIV.
Food Machinery & Chem. Corp., Peerless Pump Div.
Fraser & Chalmers Eng Wks.
Galigher Co., The
GARDNER-DENVER CO.
Gorman-Rupp Co., The
Harsco Corp., Taylor-Wharton Co., Div.
Hazelton—see Barrett, Haentjens & Co.
HYDROSEAL—see THE ALLEN-SHERMAN-HOFF PUMP CO.
Jaeger Machine Co., The
James Equipment Inc.
Johnston Pump Co.
Kansas City Hay Press Co.
KSB Klein, Schanzlin & Becker AG
LINATEX CORP. OF AMERICA
Morris Machine Works
Morse Bros. Machinery Co.
Motoramic Inc.
NAGLE PUMPS, INC.
O.D.S.—see DORR-OLIVER, INC.
Pettibone-Mulliken Corp.
Rice Pump & Machine Co.
Robbins & Myers, Inc.
SPANG & CO.
Stanco Mfgs. & Sales Inc.
Stenberg Corp. of Canada Ltd.
Telluride Iron Works Co.
Textron Inc., Homelite Div.
Thor Power Tool Co.
WESTERN MACHINERY CO., WEMCO DIV.
WILFLEY & SONS INC., A. R.
Wilkinson Rubber Linatex Ltd.
Worthington Corp.
Yuba Manufacturing Div., Yuba Consolidated Industries, Inc.

Vacuum

Allis-Chalmers Mfg. Co., Industries Group
Assoc. Electrical Industries Ltd.
Barrett, Haentjens & Co.
Basic Products Corp., Hevi-Duty Electric Co. Div.
Central Scientific Co. of Calif.
CHICAGO PNEUMATIC TOOL CO.
DORR-OLIVER INC.
Dresser Industries Inc., Roots-Connersville Industries Div.
Galigher Co.
GARDNER-DENVER CO.
Hazelton—see Barrett Haentjens & Co.
INGERSOLL-RAND CO.
Jaeger Machine Co., The
JOY MANUFACTURING CO.
KSB Klein, Schanzlin & Becker AG
Mannesmann Export GmbH
Mine Safety Appliances Co.
OLIVER—see DORR-OLIVER INC.
PETERSON FILTERS & ENG. CO.
Texas Gulf Sulphur Co.
U. S. Hoffman Machinery Corp., Industrial Equipment Divs.
Van Waters & Rogers Inc., Braun Chemical Div.
Worthington Corp.

PYROMETALLURGICAL EQUIPMENT

See also Laboratory Equipment and Supplies, Sintering Machines; Dryers and Kilns

Converters

Allis-Chalmers Mfg. Co., Industries Group
General Electric Co., Apparatus Sales Div.
Kennedy-Van Saun Mfg. & Eng. Corp.
TREADWELL CO. INC., M. H.

Electric Furnaces

Assoc. Electrical Industries Ltd.
Basic Products Corp., Hevi-Duty Electric Co. Div.
Denver Fire Clay Co., The
General Electric Co., Apparatus Sales Div.
McGraw-Edison Co., Lectromelt Furnace Div.
United States Steel Corp.

Magnetizing Roasting Kiln

Dravo Corp.
LURGI GmbH

Reverberatory Furnaces

Allis-Chalmers Mfg. Co., Industries Group
Basic Products Corp., Hevi-Duty Electric Co., Div.
Denver Fire Clay Co., The
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Mace Co., The
U. S. Smelting Furnace Co.
TREADWELL CO., INC., M. H.

Roasting Furnaces

Allis-Chalmers Mfg. Co., Industries Group
Bethlehem Steel Co.
DENVER EQUIPMENT CO.
Denver Fire Clay Co., The
DORR-OLIVER INC.
DORRCO—see DORR-OLIVER INC.
Gould & Co., Gordon I.
HARDINGE CO. INC.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LURGI GmbH
Mace Co., The
MINE & SMELTER SUPPLY CO.
Nichols Engineering & Research Corp.
Pacific Foundry & Metallurgy Co.
SKINNER—see MINE & SMELTER SUPPLY CO.
F. L. SMIDTH & CO.
Stearns-Roger Mfg. Co., The
Traylor Engr. & Mfg. Co., Div. Fuller Co.
TREADWELL CO., INC., M. H.
U. S. Smelting Furnace Co.
Westinghouse Electric Corp.

Smelting Furnaces

Allis-Chalmers Mfg. Co., Industries Group
Assoc. Electrical Industries Ltd.
Bethlehem Steel Co.
Bico, Inc.
Demag-Elektrometallurgie GmbH
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LURGI GmbH
Mace Co., The
McGraw-Edison Co., Lectromelt Furnace Div.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Traylor Engr. & Mfg. Co., Div. Fuller Co.
Treadwell Co., Inc., M. H.
U. S. Smelting Furnace Co.
United States Steel Corp.
Westinghouse Electric Corp.

RADIO SYSTEMS

See Communications

RAIL, MINE

See Track and Accessories

RAISE DRIVING PLATFORMS

ALIMAK CORP.
Hirsch Brothers Machinery Co., Inc.
JOY MANUFACTURING CO.
VULCAN IRON WORKS CO.

REAGENTS AND CHEMICALS

Chelating

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Crown Zellerbach Corp., Chemical Products Div.
Dow Chemical
Mona Industries, Inc.
Pacific Lumber Co., The
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.

Cyanide

Allied Chemical Corp., General Chemical Div.
AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

du Pont de Nemours & Co., E. I., Electrochemicals Dept.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.

Flocculents

Allied Chemical Corp., General Chemical Div.
AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Crown Zellerbach Corp.
Dow Chemical Co.
General Mills Inc., Chemical Div.
Hercules Powder Co.
Johnson-March Corp., The
Mona Industries, Inc.
Philadelphia Quartz Co.
Stauffer Chemical Co.
Van Waters & Rogers Inc., Braun Chemicals Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.

Flotation Reagents

Alamacs, Alamines—see General Mills Inc., Chem. Div.
Allied Chem. Corp., Barrett Div.
AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Archer-Daniels Midland Co.
Armour Chemical Div.
Atlas Powder Co.
Braun Chemical Co.
Crown Zellerbach Corp., Chemical Products Div.
Dow Chemical Co.
du Pont de Nemours & Co., E. I., Chemical Div.
Emery Industries, Inc.
General Mills Inc., Chemical Div.
General Mills Inc., Special Commodities Div.
Hercules Powder Co.
Koppers Co., Inc.
Mona Industries Inc.
Monsanto Chemical Co.
Newport Industries Co.
Pacific Lumber Co., The
PENNSALT CHEMICALS CORP., INDUSTRIAL CHEMICALS DIV.
Philadelphia Quartz Co.
Rohm & Haas Co.
Sharples Chemicals Inc.
Standard Oil Co. of Calif.
Stauffer Chemical Co.
Swift & Co., Technical Products Dept.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.

Grouts

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Carey Mfg. Co., The Philip

Ion Exchange Resins

Dow Chemical
Infilco, Inc.
Matheson Co., Inc., The
PETERSON FILTER & ENGINEERING CO.
Pfaudler Permutit Inc., Permutit Co. Div.
Rohm & Haas Co.
Van Waters & Rogers Inc., Braun Chemical Div.

Preservatives, Timber

American Potash & Chemical Corp.
Carbolineum Wood Preserving Co.
Dow Chemical
du Pont de Nemours & Co., E. I., Chemical Div.
General Petroleum Corp.
KOPPERS CO., INC., WOOD PRESERVING DEPT.
Monsanto Chemical Co.
Osmose Wood Preserving Co. of America, Inc.
PENNSALT CHEMICALS CORP., INDUSTRIAL CHEMICALS DIV.
PENNSALT OF WASHINGTON DIV., PENNSALT CHEMICALS CORP.
Philadelphia Quartz Co.
Standard Oil Co. of Calif.
United States Steel Corp.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.
WOLMAN—see KOPPERS CO., INC., WOOD PRESERVING DIV.

Roadbinders

Carey Mfg. Co., The Philip
Crown Zellerbach Corp., Chemical Products Div.
Van Waters & Rogers Inc., Braun Chemical Div.

Sequestering

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Crown Zellerbach Corp., Chemical Products Div.
Dow Chemical
Halliburton Oil Well Cementing Co.
Mona Industries Inc.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.

Xanthates

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
Dow Chemical
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., Div.
Walker Machinery Co.

Other Acids and Chemicals

AMERICAN CYANAMID CO., EXPLOSIVES & MINING CHEMICALS DEPT.
American Potash & Chemical Corp.
Archer-Daniels-Midland Co.
Berman Chemical Co.
Carey Mfg. Co., The Philip
Collier Carbon & Chemical Corp. (Nitric & Sulfuric Acids)
General Mills Inc., Chemical Div.
Hercules Powder Co.
Houghton & Co., B. F.
Johnson-March Corp., The
Matheson Co. Inc., The
Mona Industries Inc.
PENNSALT CHEMICALS CORP., INDUSTRIAL CHEMICALS DIV.
Swift & Co., Technical Products Dept.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co. Div.
West Chester Chemical Co.

RECORDERS

Electrical

ABC Scale Div., The McDowell Co.
Analytical Measurements Inc.
Assoc. Electrical Industries Ltd.
Atkins Technical Inc.
B-I-F Industries Inc.
Bailey Meter Co.
Barber-Colman Co., Industrial Instruments Div.
Bristol Co., The
Daystrom, Inc., Weston Instruments Div.
Electronix—see Minneapolis-Honeywell Regulator Co.
Esterline-Angus Instrument Co. Inc.
Fielden Electronics Ltd.
Fischer & Porter Co.
Foxboro Co., The
General Electric Co., Apparatus Sales Div.
Industrial Nucleonics Corp.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Infilco, Inc.
Leeds & Northrup Co.
LOGAN ENGINEERING CO.
Mine Safety Appliances Co.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Nucleonic Corp. of America
Philips Electronic Instruments
Pyrometer Instrument Co., Inc., The
Texas Instruments Inc., Industrial Products Group
Toledo Scale Co.
Uranium Instruments Co.
Westinghouse Electric Corp.

Mechanical

ABC Scale Div., The McDowell Co.
Bailey Meter Co.
Bristol Co., The
Daystrom Inc., Weston Instruments Div.
Fischer & Porter Co.
Foxboro Co., The
Howe Scale Co.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Leeds & Northrup Co.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Nucleonic Corp. of America
Toledo Scale Co.

Pneumatic

ABC Scale Div., The McDowell Co.
B-I-F Industries Inc.
Bailey Meter Co.
Bristol Co., The
Daystrom Inc., Weston Instruments Div.
Fielden Electronics Ltd.
Fischer & Porter Co.
Foxboro Co., The
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Infilco, Inc.
Minneapolis-Honeywell Regulator Co., Industrial Div.

REDUCERS, SPEED

See also Speed Changers

Allis-Chalmers Mfg. Co.
Assoc. Electrical Industries Ltd.
Bethlehem Steel Co.
Dodge Manufacturing Corp.
Eaton Manufacturing Co., Cleveland Worm & Gear Div.
Falk Corp., The
General Dynamics Corp., Electro Dynamic Div.
General Electric Co., Apparatus Sales Div.
Hathaway Instruments Inc., Sterling-Electric Motors Inc.
HEWITT-ROBINS
Iowa Mfg. Co.
Link-Belt Co.
Morse Chain Co.
NATIONAL IRON CO.
Reynolds-French & Co.
F. L. SMIDTH & CO.
Stephens-Adamson Mfg. Co.
TOOL STEEL GEAR & PINION CO.
U. S. Electrical Motors Inc.
Western Gear Corp.
Westinghouse Electric Corp.

REFRACTORIES

AIR PLACEMENT EQUIP. CO.
American Brake Shoe Co.
Babcock & Wilcox Co., The
Carborundum Co., The, Refractories Div.
Carey Mfg. Co., The Philip
Denver Fire Clay Co., The
General Refractories Co.
Harbison-Walker Refractories Co.
JOHNS-MANVILLE SALES CORP.
Kaiser Aluminum & Chem. Corp., Refractories Div.
Mexico Refractories Co.
North American Refractories Co.
Norton Co.
Robinson Clay Prod. Co., The
SPANG & CO.

RESPIRATORS

See Safety Equipment

ROASTING FURNACES

See Dryers and Kilns; Pyrometallurgical Equipment; Sintering Machines

ROCK BOLTS

See Bolts, Rock

ROD MILLS

See Grinding Equipment

RODS

See Grinding Equipment; Welding Equipment

ROLLS, ROLLERS

See Crushers; Conveyors

ROOF BOLTS

See Bolts, Rock

ROPE, WIRE, AND ACCESSORIES

American Chain & Cable Co., Inc., American Chain Div.
American Hoist & Derrick Co., Crosby-Laughlin Div.
Armco Steel Corp., Union Wire Rope Div.
Band-it Co.
Bethlehem Steel Co.
Bowdil Co., The
British Ropes Ltd.
Broderick & Bascom Rope Co.
Canada Wire & Cable Co., Ltd.
Chase Brass & Copper Co.
Coleman Cable & Wire Co.
COLORADO FUEL & IRON CORP.
COLORADO FUEL & IRON CORP., THE, JOHN A. ROEBLING'S SONS DIV.
COLUMBIA STEEL CASTING CO., INC.
Crucible Steel Co. of America
Edwards Co., E. H.
ESCO Corp.
FAGERSTA STEEL WORKS CO., LTD.
Failing Co., Geo. E.
Graybar Electric Co., Inc.
Goodrich Co., The B. F.
Griphoist, Inc.
Interstate Equipment Corp.
Jones & Laughlin Steel Corp.
JOY MANUFACTURING CO.
Laughlin Co., The Thomas
Le Tourneau-Westinghouse Co.
Mannesmann Export GmbH
MacWhyte Co.
Martin, Black & Co. (Wire Rope) Ltd.
Mill & Mine Supply, Inc.
National Mine Service Co.
Okonite Co., The
Pacific Car & Foundry Co.
Pacific Wire Rope Co.
Porter Co., H. K., Leschen Wire Rope Div.
RIBLET TRAMWAY CO.
Round Chain Cos.
Ryerson & Son, Inc., Joseph T.
Sauerman Bros, Inc.
Tournarope—see Le Tourneau-Westinghouse Co.
Uddeholm Co. of America
Union Wire Rope Corp.
United States Steel Corp., Columbia-Geneva Div.
Westfalische Union AG
WICKWIRE—see COLORADO FUEL & IRON CORP., THE
Youngstown Sheet & Tube Co., The

RUBBER PRODUCTS

See Belts; Hose; Conveyor Equipment; Safety Equipment, Tires

SAFETY EQUIPMENT

(Covering only companies cataloging these products)

Boots and Shoes

Mine Safety Appliances Co.
Rose Mfg. Co.

Clothing

AMERICAN BRATTICE CLOTH CORP.
American Optical Co., Safety Products Div.
Goodrich Industrial Products Co., B. F.
Mine Safety Appliances Co.
Parker Safety Equipment Co.
Pulmosan Safety Equipment Corp.
Rost & Co., H.

Fire Fighting

American LaFrance
American Rubber Mfg. Co.
Bullard Co., E. D.
Four Wheel Drive Auto Co., The
General Fire Extinguisher Corp., The
Goodrich Industrial Products Co., B. F.
Grinnell Co.
Halperin Co., Inc., A. E.
Industrial Air Prods. Co.
JOHNS-MANVILLE
Kidde & Co. Inc., Walter
Lee Rubber & Tire Corp., Republic Rubber Div.
Mine Safety Appliances Co.
H. K. Porter Co., Inc., Thermoid Div.
Pulmosan Safety Equipment Corp.
Safety First Supply Co.
United States Rubber Co.

Floodlight, Compressed Air

ATLAS COPCO INC.

Goggles and Glasses

American Optical Co., Safety Products Div.

Bausch & Lomb, Inc.
Martindale Electric Co.
Mine Safety Appliances Co.
Parker Safety Equipment Co.
Pulmosan Safety Equipment Corp.
Ray-O-Vac Co., Willson Products Div.
United States Safety Service Co.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann Co., Div.

Hats

Bausch & Lomb, Inc.
Bullard Co., E. D.
Goodrich Industrial Products Co., B. F.
Mine Safety Appliances Co.
Parker Safety Equipment Co.
Pulmosan Safety Equipment Corp.
Ray-O-Vac Co., Willson Products Div.

Lamps and Cap Lights

A & A Mfg. Co.
Assoc. Electrical Industries Ltd.
John Davis & Son, Ltd.
Edison—see Mine Safety Appliances Co.
ELECTRIC STORAGE BATTERY CO., THE EXIDE IND. DIV.
General Electric Co., Lamp Div.
Graybar Electric Co., Inc.
Martindale Electric Co.
Mine Safety Appliances Co.
National Mine Service Co.
Oldham & Son, Ltd.
Ray-O-Vac Co., Willson Products Div.
Revere Electric Mfg. Co.
Safety First Supply Co.
United States Electric Mfg. Corp.
Westinghouse Electric Corp.
Westinghouse Electric Corp., Cleveland Div.
WHEAT—see NATIONAL MINE SERVICE CO.

Respirators

American Optical Co., Safety Products Div.
Bullard Co., E. D.
Chicago Eye Shield Co.
Linde Co. Div., Union Carbide
Martindale Electric Co.
Mine Safety Appliances Co.
National Mine Service Co.
Pulmosan Safety Equipment Co.
Ray-O-Vac Co., Willson Products Div.
Safety First Supply Co.
Van Waters & Rogers Inc., Braun Chemical Div.
Van Waters & Rogers Inc., Braun-Knecht-Heimann Co., Div.

Safety Block

Sala-Block—**MACHINERY CENTER INC.**

Self Contained Oxygen

Bullard Co., E. D.
Chemox—see Mine Safety Appliances Co.
Industrial Air Products Co.
Linde Co., Union Carbide Div.
Mine Safety Appliances Co.
Safety First Supply Co.

SAMPLERS

ACKER DRILL CO. INC.
Carpco Mfg. Inc.
DENVER EQUIPMENT CO.
Denver Fire Clay Co.
Dickinson Laboratories, Inc.
Ducon Co.
Galigher Co., The
HANKS, INC., ABBOTT A.
HARDINGE CO., INC.
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co., Inc.
Infilco, Inc.
JOY MANUFACTURING CO.
Ledoux & Co.
LONGYEAR CO., E. J.
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO.
Mine Safety Appliances Co.
Mobile Drilling Inc.
Pennsylvania Drilling Co., Penndrill Mfg. Div.
Staplex Co., The, Air Sampler Div.
STURTEVANT MILL CO.
Telluride Iron Works Co.
Traylor Engr. & Mfg. Co.
VEZIN—see MINE & SMELTER SUPPLY CO.

SAWS, POWER

See also Tools, Air Driven

Chain Saws

Clinton Engines Corp.
Graybar Electric Co., Inc.
Mill & Mine Supply, Inc.
Remington Arms Co., Inc.
Textron Inc., Homelite Div.
VULCAN IRON WORKS

Framing Saws

DENVER EQUIPMENT CO.
Stearns-Roger Mfg. Co.

Powered Hand Saws
ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
Clinton Engines Corp.
Graybar Electric Co., Inc.
INGERSOLL-RAND CO.
Syntron Co.
Thor Power Tool Co.
VULCAN IRON WORKS
Wright Power Saw & Tool Corp.

SCALES

Automatic Weighing and Belt Scales

ABCs Scale Division, McDowell Co., Inc.
Ainsworth & Sons, Inc., Wm.
BALDWIN-LIMA-HAMILTON CORP.
B.I.F. Industries Inc.
Cardinal Scale Mfg. Co.
CON-O-WEIGH—see INDUSTRIAL PHYSICS & ELECTRONICS CO.
Conveyor Co., The
Fairbanks, Morse & Co.
Howe Scale Co.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Koehring Co., Johnson Co., C. S.
McDowell Co., Inc., The
Merrick Scale Mfg. Co.
MINE & SMELTER SUPPLY CO., THE
Richardson Scale Co.
Schaffer Poidometer Co.
Stephens-Adamson Mfg. Co.
Toledo Scale Co., Toledo Scale Div.

Truck and Railroad Scales

Cardinal Scale Mfg. Co.
Fairbanks, Morse & Co.
Howe Scale Co.
INDUSTRIAL PHYSICS & ELECTRONICS CO.
Richardson Scale Co.
Toledo Scale Co., Toledo Scale Div.

SCALING PLATFORMS

ALIMAK CORP.
Landis Steel Co.
Rogers Iron Works Co.

SCRAPERS

See also Excavators; Tractors and Attachments

ACEC
Allis-Chalmers Mfg. Co., Const. Machy. Div.
Allis-Chalmers Mfg. Co., Industries Group
ALLOY STEEL & METALS CO.
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
American Tractor Equipment Corp.
BALDWIN-LIMA-HAMILTON CORP.
British Ropeway Engineering Co. Ltd.
Caterpillar Tractor Co.
Clark Equipment Co., Const. Machy. Div.
COLUMBIA STEEL CASTING CO., INC.
Curtiss-Wright Corp., South Bend Div.
Demag Aktiengesellschaft
EIMCO Corp.
ESCO Corp.
GENERAL MOTORS CORP., EUCLID DIV.
HEWITT-ROBINS
International Harvester Co.
JOY MANUFACTURING CO.
Landis Steel Co.
Le Tourneau-Westinghouse Co.
MACHINERY CENTER INC.
Michigan—see Clark Equipment Co.
McCullough Equipment Co.
M-R-S Manufacturing Co.
PACIFIC—see ALLOY STEEL & METALS CO.
Pillman Slusher—see McCullough Equipment Co.
Pacific Car & Foundry Co.
Sauerman Bros., Inc.
VULCAN IRON WORKS CO.
Westinghouse Air Brake Co. (Pa.)

SCREENS, GRIZZLIES, AND ACCESSORIES

Enclosed

DEISTER CONCENTRATOR CO., INC., THE
Deister Machine Co.
GRUENDLER CRUSHER & PULVERIZER CO.
Link-Belt Co.
Screen Equipment Co., Inc.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Tyler Co., The W. S.
Universal Vibrating Screen Co.

Heated

DEISTER CONCENTRATOR CO., INC., THE
Deister Machine Co.
GRUENDLER CRUSHER & PULVERIZER CO.
HEWITT-ROBINS
Link-Belt Co.
Screen Equipment Co. Inc.
Smith Engineering Works
Simplicity Engineering Co.
Tyler Co., The W. S.
Universal Vibrating Screen Co.

Revolving Screens

Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Bonded Scale & Machine Co.
Cleveland Wire Cloth & Mfg. Co.
COLORADO FUEL & IRON CORP.
Conveyor Co., The
Davis Foundry & Machine Wks.
Davison & Co. (Hexham) Ltd.
DENVER EQUIPMENT CO.
Eagle Crusher Co. Inc.
Fraser & Chalmers Eng. Works
GRUENDLER CRUSHER & PULVERIZER CO.
Goodman Manufacturing Co., Diamond Iron Works Div.
Hack Engineering Co.
Hammermills Inc.
Hendrick Mfg. Co.
Hirsch Brothers Machinery Co., Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works, Inc.
Mace Co., The
NATIONAL IRON CO.
NORDBERG MFG. CO.
Poor & Co., Inc., Pioneer Engineering Div.
Rogers Iron Works Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Stearns-Roger Mfg. Co.
Stephens-Adamson Mfg. Co.
SYMONS—see NORDBERG MFG. CO.
Technical Fabricators Inc.
Tyler Co., The W. S.
Universal Dredge Mfg. Co.
Universal Road Machinery Co.
Washington Iron Works
Washington Machinery Co.
Wedge Wire Corp.
Yuba Consolidated Industries, Inc.

Shaking and Vibrating Screens

Aero-Vibe—see Allis-Chalmers Mfg. Co.
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
BALDWIN-LIMA-HAMILTON CORP.
Barber-Greene Co.
Bonded Scale & Machine Co.
Buttner Works Inc.
Carpco Mfg. Inc.
Chain Belt Co.
Cleveland Wire Cloth & Mfg. Co., Inc., The
COLORADO FUEL & IRON CORP.
Conveyor Co., The
Davis Foundry & Machine Wks.
DEISTER CONCENTRATOR CO., INC., THE
Deister Machine Co.
DENVER EQUIPMENT CO.
Dravo Corp.
Eagle Crusher Co. Inc.
Exolon Co., The
Fraser & Chalmers Eng. Wks.
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.
Haver & Boecker
Hendrick Mfg. Co.
HEWITT-ROBINS
Hirsch Brothers Machinery Co., Inc.
Hum-mer—see Tyler Co., The W. S.
Iowa Mfg. Co.
Jeffrey Manufacturing Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Lippmann Engineering Works Inc.
Mace Co., The
McNally Pittsburgh Mfg. Corp.
MINE & SMELTER SUPPLY CO., THE MARCY MILL DIV.
Morgardshammars Mek. Verkstads AB
Morse Bros. Machinery Co.
NORDBERG MFG. CO.
Poor & Co., Inc., Pioneer Engineering Div.
Ripl Flo—see Allis-Chalmers Mfg. Co.
Rogers Iron Works Co.
Ross Screen & Feeder Co.
Screen Equipment Co., Inc.
Simplicity Engineering Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Sta Kleen—see Allis-Chalmers Mfg. Co.
Star Wire Screen & Iron Works, Inc.
Stearns-Roger Mfg. Co.
Stephens-Adamson Mfg. Co.
Straub Mfg. Co. Inc.
STURTEVANT MILL CO.
SYMONS—see NORDBERG MFG. CO.
Symons Bros. Co.
Syntron Co.
Technical Fabricators Inc.
Thermo-Deck—see Allis-Chalmers Mfg. Co.
Ty-Rock—see Tyler Co., The W. S.
Tyler Co., The W. S.
Universal Dredge Mfg. Co.
Universal Vibrating Screen Co.
Wedge Wire Corp.
Williams Crusher & Pulverizer Co.

Spray Nozzles

Carborundum Co., The, Refractories Div.
Chain Belt Co.
DEISTER CONCENTRATOR CO., INC., THE
ESCO Corp.
Link-Belt Co.
Poor & Co. Inc., Pioneer Engineering Div.
Spraying Systems Co.

Stationary Screens and Grizzlies

Allison Steel Mfg. Co.
AMERICAN BRAKE SHOE CO.
Bixby-Zimmer Eng. Co.
Bonded Scale & Machine Co.
CAL-WIC—see COLORADO FUEL & IRON CORP., THE
CARD IRON WORKS CO., THE C. S.
Cleveland Wire Cloth & Mfg. Co.
COLORADO FUEL & IRON CORP.
COLUMBIA STEEL CASTING CO. INC.
Davis Foundry & Machine Wks.
DORR-OLIVER INC.
Eagle Crusher Co. Inc.
ESCO Corp.
Goodman Manufacturing Co., Diamond Iron Works Div.
GRUENDLER CRUSHER & PULVERIZER CO.
Hack Engineering Co.
Hammermills Inc.

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Hendrick Mfg. Co.
HEWITT-ROBINS
Iowa Mfg. Co.
Jeffrey Mfg. Co., The
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works Inc.
MALLIX—see NATIONAL MALLEABLE & STEEL CASTINGS CO.
McLANAHAN CORP.
NATIONAL IRON CO.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Nolan Co., The
NORDBERG MFG. CO.
Poor & Co., Inc., Pioneer Eng. Div.
Rogers Iron Works Inc.
Ross Screen & Feeder Co.
Simplicity Eng. Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Star Wire Screen & Iron Works Inc.
Stearns-Roger Mfg. Co.
Stephens-Adamson Mfg. Co.
Straub Mfg. Co. Inc.
Syntron Co.
Technical Fabricators Inc.
Telluride Iron Works
Traylor Engineering & Mfg. Co. Div., Fuller Co.
Tyler Co., The W. S.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Washington Machinery Co.
Wedge Wire Corp.
Yuba Consolidated Indus. Mining Co.

Wire and Bar Screens

Allis-Chalmers Mfg. Co.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Barber-Greene Co.
Bixby-Zimmer Engr. Co.
Bonder Scale & Machine Co.
CAL-WIC—see COLORADO FUEL & IRON CORP.
Chain Belt Co.
Chase Brass & Copper Co.
Cleveland Wire Cloth & Mfg. Co.
COLORADO FUEL & IRON CORP.
Goodman Manufacturing Co., Diamond Iron Works Div.
Greening & Sons. Ltd., N.
Hack Engineering Co.
Hammermills Inc.
Harsco Corp., Taylor-Wharton Co. Div.
Haver & Boecker
Hendrick Mfg. Co.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
Lippmann Engineering Works
Ludlow-Saylor Wire Cloth Co.
MALLIX—see NATIONAL MALLEABLE & STEEL CASTINGS CO.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
NORDBERG MFG. CO.
Poor & Co., Inc., Pioneer Eng. Div.
Productive Equipment Corp.
Ross Screen & Feeder Co.
Simplicity Engineering Co.
Smith Engineering Works
SOUTHWESTERN ENGINEERING CO.
Stearns-Roger Mfg. Co.
SYMONS—see NORDBERG MFG CO.
Ty-Loc—see Tyler Co., The W. S.
Tyler Co., The W. S.
Universal Dredge Mfg. Co.
Universal Engineering Corp.
United States Steel Corp.
Wedge Wire Corp.
Yuba Consolidated Indus., Mining Div.

SCRUBBERS

See also Agitators and Conditioners; Engine Exhaust Conditioners

Gas

Buell Engineering Co. Inc.
DORR-OLIVER INC.
Ducon Co., Inc., The
EIMCO Corp.
International Harvester Co.
Johnson-March Corp., The
NATIONAL MINE SERVICE CO.
National Tank & Pipe Co.
Oretrue, Inc.
Oxy-Catalyst, Inc.
PETERSON FILTERS & ENGR. CO.
Ruth Co., The
STANDARD STEEL CORP.
Stearns-Roger Mfg. Co., The
WESTERN MACHINERY CO., WEMCO DIV.
WESTERN PRECIPITATION CORP.
Windeler Co., Ltd., George
Winslow Eng. & Mfg. Co.

Minerals Washer

Allis-Chalmers Mfg. Co., Industries Group
Booth Co., Inc., The
DENVER EQUIPMENT CO.
GRUENDLER CRUSHER & PULVERIZER CO.
Hammermills Inc.
HARDINGE CO., INC.
Iowa Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Link-Belt Co.
Lippmann Engineering Works Inc.
MARCY—see MINE & SMELTER SUPPLY CO., THE
McLANAHAN CORP.
MINE & SMELTER SUPPLY CO.
Poor & Co., Inc., Pioneer Eng. Div.
Rogers Iron Works Co.
Smith Engineering Works
Telluride Iron Works
Universal Dredge Mfg. Co.
Universal Engineering Corp.
Washington Machinery Co.
WESTERN MACHINERY CO., WEMCO DIV.
Windeler Co., Ltd., George

SELF-LOADING TRANSPORT

Allis-Chalmers Mfg. Co., Industries Group
ATLAS COPCO INC.
Benoto, Inc.
EIMCO Corp.
HEWITT-ROBINS
Jeffrey Mfg. Co.
Link-Belt Co.
MACHINERY CENTER INC.
Napco Industries, Inc.
Sanford-Day Iron Works, Inc.
Shaft & Development Mach. Co.
Transloader—see Sanford-Day Iron Works, Inc.
Westinghouse Air Brake Co., (Pa.)
Westinghouse Air Brake Co., Le Roi Div.

SEPARATORS

See also Magnetic Equipment; Classifiers; Concentrators

Air

American Air Filter Co., Inc.
Combustion Engineering, Inc., Raymond Div.
DENVER EQUIPMENT CO.
EIMCO Corp.
Gebruder Hischmann Maschinenfabrik
Hankison Corp.
HARDINGE CO., INC.
INGERSOLL-RAND
I-T-E Circuit Breaker Co.
James Equipment Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
LOGAN ENGINEERING CO.
Majac Inc.
Scott Concentrators
STURTEVANT MILL CO.
Universal Road Machinery Co.
Williams Patent Crusher & Pulverizer Co.

Electrostatic

American Air Filter Co., Inc.
Carpco Mfg. Inc.
Dings Magnetic Separator
Fraser & Chalmers Eng. Works
Johnson, Consultant, Herbert B.
JOY MANUFACTURING CO. DIESEL ENERGY CORP. MARCY MILL DIV.
KLOCKNER-HUMBOLDT-DEUTZ AG
Magnetic Engineering & Mfg. Co.
Scott Concentrators
Stearns Magnetic Products, Div., The Indiana General Corp.
Westinghouse Electric Co.

High Tension

Carpco Mfg. Inc.
Dings Magnetic Separator Co.
Exolon Co., The
JOY MANUFACTURING CO.
Johnson Herbert B.
Magnetic Engineering & Mfg. Co.
Scott Concentrators
Stearns Magnetic Products Div., The Indiana General Corp.

SETS, STEEL

See Steel

SHAFT COUPLINGS

See Couplings

SHAFT-MOUNTED DRIVES

See also Drives; Gears; Open Gearing

Allis-Chalmers Mfg. Co., Industries Group
Brown Inc., David
Dodge Manufacturing Corp.
Falk Corp., Inc.
General Electric Co., Apparatus Sales Div.
HEWITT-ROBINS
Link-Belt Co.
Morse Chain Co.
NATIONAL IRON CO.
Stephens-Adamson Mfg. Co.
TOOL STEEL GEAR & PINION CO.
U. S. Electrical Motors Inc.
Westinghouse Electric Corp.

SHAFT SINKING

Cages

ALIMAK CORP.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Connellsville Corp.
Hirsch Brothers Machinery Co., Inc.
LAKE SHORE INC.
MACHINERY CENTER INC.
Shaft & Development Mach. Co.
VULCAN IRON WORKS CO.

Contractors

BOYLES BROS. DRILLING CO.
COWIN & CO., INC.
Dravo Corp.
LONGYEAR CO., E. J.

Equipment

ACEC
ATLAS COPCO, INC.
Barrett, Haentjens & Co.
BOYLES BROS. DRILLING CO.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Demag Aktiengesellschaft
EIMCO Corp.
Eisenhutte Prinz Rudolph AG
Hirsch Brothers Machinery Co., Inc.
HUGHES TOOL CO. (CUTTERS)
INGERSOLL-RAND CO., LTD.
JOY MANUFACTURING CO.
Kaiser Engineers
Live Roller Mills Mfg. Co.
MACHINERY CENTER INC.
Mayo Tunnel & Mine Equipment
Miners Foundry & Mfg. Co.
Shaft & Development Mach. Co.
Telluride Iron Works Co.
Thor Power Tool Co.
Unit Rig & Equipment Co.
VULCAN IRON WORKS CO.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.

Formation Consolidation

BOYLES BROS. DRILLING CO.

Jumbos

ATLAS COPCO INC.
CHICAGO PNEUMATIC TOOL CO.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Le Roi Div., Westinghouse Air Brake Co.
MACHINERY CENTER INC.
Rogers Iron Works Co.
Shaft & Development Mach. Co.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.

Muckers

ALIMAK CORP.
ATLAS COPCO INC.
Bucyrus-Erie Co.
COEUR D'ALENES CO., THE
EIMCO Corp.
JOY MANUFACTURING CO.
MACHINERY CENTER INC.
Shaft & Development Mach. Co.
VULCAN IRON WORKS CO.

Skips & Buckets

BOYLES BROS. DRILLING CO.
CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
Connellsville Corp.
Hirsch Brothers Machinery Co., Inc.
Irwin-Sensenich Corp.
LAKE SHORE INC.
MACHINERY CENTER INC.
Mayo Tunnel & Mine Equipment
Shaft & Development Mach. Co.
VULCAN IRON WORKS CO.

Steel Forms

COEUR D'ALENES CO., THE
Hirsch Brothers Machinery Co., Inc.
MACHINERY CENTER INC.
Mayo Tunnel & Mine Equipment
Shaft & Development Mach. Co.

SHAKERS, CAR

Allis-Chalmers Mfg. Co., Industries Group
Carrier Conveyor Corp.
Cleveland Vibrator Co., The
HEWITT-ROBINS
Link-Belt Co.
PLANT-DOUGLASS
Robbins & Myers, Inc.
Sanford-Day Iron Works, Inc.
Simplicity Engr. Co.
Stephens-Adamson Mfg. Co.
Syntron Co.

SHARPENERS, ROCK BIT AND STEEL

Armour & Co., Coated Abrasives Div., Alliance, Ohio
ATLAS COPCO, INC.
Climax Rock Drill & Engineering Works, Ltd.
COEUR D'ALENES CO., THE
Dravo Corp.
Demag Aktiengesellschaft
GARDNER-DENVER CO.
Grindex—see Uddeholm Co. of America, Inc.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
MASSCO—see MINE & SMELTER SUPPLY CO.
MINE & SMELTER SUPPLY CO.
Sandvik Steel Inc.
Security Engineering Div., Dresser Operations, Inc.
Thor Power Tool Co.
Uddeholm Co. of America, Inc.

SHEAVES

See Blocks and Sheaves

SHOVELS, POWER

See Excavators

SHUTTLE CARS

GETMAN BROTHERS MFG. CO.
Goodman Manufacturing Co.
Hirsch Brothers Machinery Co., Inc.
Hudson Ltd., Robert
Irwin-Sensenich Corp.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
K-W Dart Truck Co.
LAKE SHORE INC.
MACHINERY CENTER INC.
NATIONAL MINE SERVICE CO.
Washington Iron Works

SINKERS

See Drills, Rock

SINTERING MACHINES

See also Pyrometallurgical Equipment; Dryers and Kilns, Pelletizers
Allis-Chalmers Mfg. Co., Industries Group
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
Dravo Corp.
ESCO Corp.
Heyl & Patterson, Inc.
Kennedy-Van Saun Mfg. & Eng. Corp.
LURGI GmbH

Mace Co., The
McDowell Co., Inc., The Dwight Lloyd Div.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
SMIDTH & CO., F. L.
STANDARD STEEL CORP.
Stearns-Roger Mfg. Co., The

SKIPS

See Hoisting Equipment

SLACKLINES

See Excavators

SLINGS

See Rope, Wire

SLUSHERS

See Excavators; Hoisting Equipment; Scrapers

SMELTING & REFINING EQUIPMENT

See Pyrometallurgical Equipment

SOLVENTS, URANIUM

See Reagents and Chemicals

SPEED CHANGERS, INCREASERS AND/OR REDUCERS

Louis Allis Co.
Assoc. Electrical Industries Ltd.
Bethlehem Steel Co.
Conveyor Co., The
Dodge Manufacturing Corp.
Eaton Manufacturing Co., Cleveland Worm & Gear Div.
Falk Co., The
General Electric Co., Apparatus Sales Div.
Hathaway Instruments Inc., Sterling Electric Motors Inc.
HEWITT-ROBINS
Link-Belt Co.
Morse Chain Co.
Ohio Gear Co.
Reliance Electric & Engineering Co.
Reynolds-French & Co.
F. L. SMIDTH & CO.
U. S. Electric Motors Inc.
Westinghouse Electric Corp.

SPIRALS

See Concentrators

SPOTTERS, CAR

Aldon Company, The
Appleton-Atlas Car Mover Corp.
Badger Samson Line—see Advance Car Mover Co., Inc.
Brownie—see Sanford-Day Iron Wks.
Clyde Iron Works, Inc.
Connellsville Corp.
HEWITT-ROBINS
Hough Co., The Frank G.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
Link-Belt Co.
McNally Pittsburgh Mfg. Corp.
Nolan Co., The
Sanford-Day Iron Works, Inc.
Shepard Niles Crane & Hoist Corp.
Stephens-Adamson Mfg. Co.
Superior-Lidgerwood Mundy Corp.
VULCAN IRON WORKS CO.
Westfall Equipment Co.

STACKERS

Ore or Waste

Hack Engineering Co.
HEWITT-ROBINS
Jeffrey Mfg. Co.
Link-Belt Co.
Orenstein-Koppel Und Lubecker Maschinenbau AG
Poor & Co., Inc., Pioneer Engineering Div.
Stephens-Adamson Mfg. Co.

STEEL

See also Bits

Alloy Steel & Metals Co.

Allied Steel & Tractor Products, Inc.
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
Armco Steel Corp.
ATLAS COPCO, INC.
Bedford & Sons Ltd., John
Bethlehem Steel Co.
Brunner & Lay Inc.
Central Mine Equip. Co.
Crucible Steel Co. of America
ESCO Corp.
FAGERSTA STEEL WORKS CO., LTD.
FAGERSTA STEELS PACIFIC, INC.
Firth Sterling, Inc.
GARDNER-DENVER CO.
Ingersoll-Rand Co.
Kaiser Steel Corp.
NATIONAL MALLEABLE & STEEL CASTINGS CO.
Pacific States Steel Corp.
Republic Steel Corp.
Ryerson & Son Inc., Joseph T.
SANDVIK COROMAT—see ATLAS COPCO INC.
Sheffield Div., Armco Steel Corp.
Sheffield Hollow Drill Steel Co. Ltd.
Stulz-Sickles Co.
Tennessee Coal & Iron Div., United States Steel Corp.
Timken Roller Bearing Co., The
Uddeholm Co. of America
United States Steel Corp., Columbia-Geneva Div.
Youngstown Sheet & Tube Co., The

Drill Steel

Allison Steel Mfg. Co.
AMERICAN BRAKE SHOE CO.
AMSCO—see AMERICAN BRAKE SHOE CO.
ATLAS COPCO, INC.
Bedford & Sons Ltd., John
Bethlehem Steel Co.
Brunner & Lay Inc.
Christensen Diamond Products Co.
Crucible Steel Co. of America
FAGERSTA STEELS PACIFIC, INC.
Firth Sterling, Inc.
GARDNER-DENVER CO.
INGERSOLL-RAND CO.
Jones & Laughlin Steel Corp.
JOY MANUFACTURING CO.
Kennametal Inc.
E. J. LONGYEAR CO.
MCCLINTOCK CO., R. S.
Mine Safety Appliances Co.
Mobile Drilling Inc.
Pennsylvania Drilling Co., Penndrill Div.
Republic Steel Corp.
Ryerson & Son, Inc., Joseph T.
SKF Hellefors Jernverk
Sandvik Steel Inc.
Sheffield Div., Armco Steel Corp.
Sheffield Hollow Drill Steel Co. Ltd.
Stahlwerke Sudwestfalen AG
Textron Inc., Homolite Div.
Thor Power Tool Co.
Uddeholm Co. of America
United States Steel Corp.
VAREL MFG. CO.
Westinghouse Air Brake Co., Le Roi Div.

Sets—Steel

Allison Steel Mfg. Co.
Bethlehem Steel Co.
Bochumer Eisenhutte
COLORADO FUEL & IRON CORP.
Commercial Shearing & Stamping Co.
FAGERSTA STEELS PACIFIC, INC.

Sets, Steel, Yieldable

Bethlehem Steel Co.
Bochumer Eisenhutte
Commercial Shearing & Stamping Co.
FAGERSTA STEELS PACIFIC, INC.

Structural Steel

(Covering only companies cataloging this product)
Allison Steel Mfg. Co.
Bethlehem Steel Co.
Kaiser Steel Corp.
Pacific States Steel Corp.
SKF Hellefors Jernverk
United States Steel Corp., Columbia-Geneva Div.
Youngstown Sheet & Tube Co., The
Yuba Consolidated Industries Inc.

STOPERS

See Drills, Rock

SURVEYING INSTRUMENTS

See also Engineering and Drafting Equipment; Exploration Equipment
Ainsworth & Sons, Inc., Wm.
Atkins Technical Inc.
Bausch & Lomb Optical Co.
Berger & Sons, Inc., C. L.
Booklime Inc.
Curta Co.
Detectron Div., Computer-Measurements Co.
Dietzgen Co., Eugene
Eberline Inst. Div., Reynolds Elect. & Eng. Co.
Fennel Sohne KG, Otto
Gebruder Hischmann Maschinenfabrik
Geo-Optic & Paper Corp.
Gurley, W. & L. E.
Heinrichs Geoexploration Co.
International Geophysics, Inc.
Kern Instruments, Inc.
Keuffel & Esser Co.
Leitz Co., The A.
Lufkin Rule Co.
Menlo Research Lab.
Nucleonic Corp. of America
Realist Inc., David White Instruments Div.
Rocky Mountain Instrument Co.
Wild Heerbrugg Instruments, Inc.

SWITCHES, RAIL

See Track and Accessories

TABLES

See Concentrators

TANKS, STORAGE

See Thickeners and Tanks; Agitators and Conditioners
Aluminum Co. of America
BARBER-WEBB CO., INC.
Bethlehem Steel Co.
Black, Sivalls & Bryson Inc.
Butler Mfg. Co.
Colonial Plastics Mfg. Co.
DENVER EQUIPMENT CO.
Goodrich Industrial Products Co., B. F.
Hirsch Brothers Machinery Co., Inc.
Hydraulic Supply Mfg. Co.
Kaiser Steel Corp.
Landis Steel Co.
Lead Lined Iron Pipe Co.
National Tank & Pipe Dept., Simpson Engrd. Wood Products Co.
SOUTHWESTERN ENGINEERING CO.
Stearns-Roger Mfg. Co., The
United States Rubber Co.
United States Steel Co.
Yuba Consolidated Industries Inc.
Windeler Co., Ltd., George

TELEPHONES

See Communications

TELEVISION, INDUSTRIAL

See Communications

TESTING

See Laboratories

THICKENERS AND TANKS

See also Cyclones

Steel Tanks

Allison Steel Mfg. Co.
BARBER-WEBB CO., INC.
Bethlehem Steel Co.
Bird Machine Co.
Black, Sivalls & Bryson, Inc.
Butler Mfg. Co.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
Hack Engineering Co.
Hirsch Brothers Machinery Co., Inc.
Hydraulic Supply Mfg. Co.
Infilco, Inc.
Kaiser Steel Corp.
Landis Steel Co.
MORSE BROS. MACHINERY CO.
Sanford-Day Iron Works, Inc.
Stearns-Roger Mfg. Co.
United States Steel Corp.
Washington Iron Works
Washington Mach. Co.
Wilmot Engineering Co.

Thickeners

Allison Steel Mfg. Co.
Bethlehem Steel Co.
Butler Mfg. Co.
Chain Belt Co.
DENVER EQUIPMENT CO.
DORR-OLIVER INC.
Eagle Iron Works
EIMCO Corp.
HARDINGE CO., INC.
Heyl & Patterson, Inc.
Hirsch Brothers Machinery Co., Inc.
Infilco, Inc.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Link-Belt Co.
MORSE BROS. MACHINERY CO.
National Tank & Pipe Co.
PETERSON FILTERS & ENGR. CO.
Stearns-Roger Mfg. Co., The
WESTERN MACHINERY CO., WEMCO DIV.
Windeler Co., Ltd., George

Wood Tanks

Black, Sivalls & Bryson Inc.
DENVER EQUIPMENT CO.
MORSE BROS. MACHINERY CO.
National Tank & Pipe Co.
Simpson Engineered Wood Prods. Co., National Tank & Pipe Dept.
Windeler Co., Ltd., George

TIES, TRACK

See Track and Accessoires

TIMBER

Mine

Koppers Co., Inc.
Osmose Wood Preserving Co. of America, Inc.
Stanton & Son, Inc., E. J.

Shaft Guides

General Hardwood Co.
KOPPERS CO., INC.
Stanton & Sons, Inc., E. J.

Timber Framing Machines

DENVER EQUIPMENT CO.
Goodman Manufacturing Co.
Stearns-Roger Mfg. Co., The

TIRES AND TUBES, OFF-HIGHWAY

Firestone Tire & Rubber Co., The
Gates Rubber Co., The
The General Tire & Rubber Co.
Goodrich Co., The B. F.
Goodyear Tire & Rubber Co.
United States Rubber Co.

TOOLS, AIR-DRIVEN PORTABLE

See also Drills, Rock
ATLAS COPCO INC.
Bedford & Sons Ltd., John
CHICAGO PNEUMATIC TOOL CO.

Manufacturers' complete names and addresses are listed on the last page of this yellow section. Advertisers in this issue are liste din boldface capital letters

GARDNER-DENVER CO.
Holman Bros. Ltd.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
Porter Inc., H. K.
H. K. Porter Co. Inc., Forge & Fittings Div.
SCHRAMM, INC.
Thor Power Tool Co.
Westinghouse Air Brake Co., Le Roi Div.
Wheel Trueing Tool Co.

TORQUE CONVERTERS

See Transmissions

TRACK & ACCESSORIES

(Covering only companies cataloging these products)

Rail and Ties, Steel

Aldon Co., The
Allison Steel Mfg. Co.
Bethlehem Steel Co.
CF&I—see COLORADO FUEL & IRON CORP.
Central Frog & Switch Co., The
COEUR D'ALENES CO., THE
COLORADO FUEL & IRON CORP.
Hudson Ltd., Robert
Porter Co., Inc., H. K., Connors Steel Div.
United States Steel Corp., Columbia-Geneva Div.
United States Steel Corp., Tennessee Coal & Iron Div.

Switches, Frogs, Crossings, Etc.

Aldon Co., The
American Brake Shoe Co.
AMERICAN MINE DOOR CO.
Atlas Car & Mfg. Co., The
Bethlehem Steel Co.
British Insulated Callender's Ltd.
CARD IRON WORKS CO., THE C. S.
Central Frog & Switch Co., The
EIMCO Corp.
ELECTRI-THROW—see AMERICAN MINE DOOR CO.
Harsco Corp., Taylor-Wharton Co. Div.
Hudson Ltd., Robert
KOPPERS CO., INC.
Nolan Co., The
Pettibone-Mulliken Corp.
United States Steel Corp., Columbia-Geneva Div.

Track Cleaning Machines

AMERICAN MINE DOOR CO.
Athey Products Corp.
LAKE SHORE INC.
NORDBERG MFG. CO.

Special Track Equipment

Aldon Co., The

TRACTORS & ATTACHMENTS

See also Engine Exhaust Conditioners, Underground

Crawler

ALIMAK CORP.
Allied Steel & Tractor Products, Inc.
Caterpillar Tractor Co.
Craig Carroll Co.
John Deere
Drott Manufacturing Corp.
EIMCO Corp.
General Motors Corp., Euclid Div.
Hough Co., The Frank G.
Joost Manufacturing Co.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.

Rubber Tired

Agricat—see Joost Mfg. Co.
Allis-Chalmers Mfg. Co., Industries Group
American M.A.N. Corp.
Autocar—see The White Motor Co., Autocar Div.
Caterpillar Tractor Co.
Clark Equipment Co., Construction Machy. Div.
Curtiss-Wright Corp., South Bend Div.
John Deere
Drott Manufacturing Corp.
EIMCO Corp.
GENERAL MOTORS, EUCLID DIV.
Hough Co., The Frank G.
INTERNATIONAL HARVESTER CO.
Joost Manufacturing Co.
JOY MANUFACTURING CO.
KLOCKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Koehring Co., Kwik-Mix Co. Div.
LeTourneau-Westinghouse Co.
MACK TRUCKS, INC.
Michigan Turbo-Dozer—see Clark Equipment Co.
Minneapolis-Moline Co.
MRS Mfg. Co.
Napco Industries, Inc., Federal Motor Truck Div.
Oliver Corp., The
Pettibone-Mulliken Corp.
Sheppard Co., R. H.
SOUTHWESTERN ENGINEERING CO.
Tournatractors—see LeTourneau-Westinghouse Co.
Unimog—see Curtiss-Wright Corp., South Bend Div.
Westfall Equipment Co.
Westinghouse Air Brake Co. (Pa.)
Westinghouse Air Brake Co., Le Roi Div.
White Motor Co., The, Autocar Div.

Attachments

ALIMAK CORP.
Allied Steel & Tractor Products, Inc.
Allis-Chalmers Mfg. Co., Const. Machy. Div.
American Brake Shoe Co.
American Tractor Equipment Co.
Athey Products Corp.
Caterpillar Tractor Co.
Clark Equipment Co., Const. Machy. Div.
Craig Carroll Co.
Curtiss-Wright Corp., South Bend Div.
John Deere
Drott Manufacturing Corp.
EIMCO Corp.
ESCO Corp.
Gar Wood Industries, Inc.
General Motors Corp.
Hercules Galion Products, Inc.
Hough Co., The Frank G.
Hyster Co.
INTERNATIONAL HARVESTER CO.
Joost Manufacturing Co.
JOY MANUFACTURING CO.
LeTourneau-Westinghouse Co.
LIBU SHOVEL CO., AB
Minneapolis-Moline Co.
M-R-S Manufacturing Co.
Oliver Corp., The
Pacific Car & Foundry Co.
Service Supply Corp.
Skookum Co. Inc., The
Southwestern Engineering Co.
Tractomotive Corp.
Westfall Equipment Co.
Westinghouse Air Brake Co., Cleveland Rock Drill Div.
Westinghouse Air Brake Co., Le Roi Div.

TRAIN LOADER SYSTEMS

See also Loaders; Cars

Coupled Conveyor Cars

Irwin-Sensenich Corp.

Slusher Train

CARD IRON WORKS CO., THE C. S.
COEUR D'ALENES CO., THE
EIMCO Corp.
JOY MANUFACTURING CO.
LAKE SHORE INC.
MACHINERY CENTER INC.
Sanford-Day Iron Works Inc.
VULCAN IRON WORKS CO.

TRAMMERS

See Locomotives

TRAMWAYS, AERIAL

Buckets

AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
British Ropeway Engineering Co. Ltd.
Interstate Equipment Corp.
Irwin-Sensenich Corp.
RIBLET TRAMWAY CO.
Sanford-Day Iron Works, Inc.
Shepard Niles Crane & Hoist Corp.
Stearns-Roger Mfg. Co.
U. S. Steel Corp., American Steel & Wire Div.
Washington Iron Works

Cable

Bethlehem Steel Co.
British Ropes Ltd.
British Ropeway Engineering Co., Ltd.
Canada Wire & Cable Co., Ltd.
Interstate Equipment Corp.
RIBLET TRAMWAY CO.
ROEBLINGS SONS CORP.
Sauerman Bros., Inc.
United States Steel Corp., Columbia-Geneva Steel Div.
United States Steel Corp., Columbia-Geneva Div.
Washington Iron Works
Westfalische Union AG

Towers

Allison Steel Mfg. Co.
British Ropeway Engineering Co. Ltd.
Interstate Equipment Corp.
RIBLET TRAMWAY CO.
Sauerman Bros., Inc.
Stearns-Roger Mfg. Co.
Telluride Iron Wks.
U. S. Steel Corp.
Washington Iron Works

TRANSFERS, CAR

AMERICAN MINE DOOR CO.
Atlas Car & Mfg. Co., The
CANTON—see AMERICAN MINE DOOR COMPANY
CARD IRON WORKS CO., THE C. S.
EIMCO Corp.
Hudson Ltd., Robert
Mayo Tunnel & Mine Equip.
McDowell Co., Inc.
Sanford-Day Iron Works Inc.
United States Steel Corp.
Washington Iron Works

TRANSITS

See Surveying Instruments and Equipment

TRANSMISSIONS AND TORQUE CONVERTERS

American Blower Div. of American Standard
Caterpillar Tractor Co.
Dodge Manufacturing Corp.
Dowty Mining Equipment Ltd.
EIMCO Corp.
Four Wheel Drive Auto Co., The
Fuller Mfg. Co.
General Electric Co., Apparatus Sales Div.
General Motors Corp., Allison Div.
KOPPERS CO., FAST'S COUPLING DEPT.
Lima Electric Motor Co.
Morse Chain Co.
National Supply Co., The
Ohio Gear Co.
Philadelphia Gear Works, Inc.
Reliance Electric & Engineering Co.
Twin Disc Clutch Co.
U. S. Electrical Motors, Inc.
Western Gear Corp. (Lynwood)

TRIPPERS

See Conveyor Equipment

TROLLEY EQUIPMENT

See also Locomotives

British Insulated Callender's Ltd.
COLORADO FUEL & IRON CORP.
Elreco Corp., The
Goodrich Industrial Products Co., B. F.
Jeffrey Mfg. Co.
Link-Belt Co.
National Mine Service Co.
Ohio Brass Co.
Ohio Hoist & Mfg. Co.
Shepard Niles Crane & Hoist Corp.
Westinghouse Electric Co.

TROMMELS

See Screens, Grizzlies, and Accessories

TRUCKS

See Cars, Mine

TRUCK AND TRAILERS

See also Haulage Units

Electric Wheel Drive Truck

General Electric Co., Apparatus Sales Div.
GETMAN BROTHERS MFG. CO.
Unit Rig & Equipment Co.

Off-Highway

Athey Products Corp.
Autocar—see The White Motor Co., Autocar Trucks Div.
Chrysler Corp., Dodge Div.
Consolidated Metal Prods., Inc.
Curtiss-Wright Corp., South Bend Div.
Differential Steel Car Co.
Easton Car & Construction Co.
FWD—Four Wheel Drive Auto Co., The
Fruehauf Trailer Co.
Galion Allsteel Body Co.
GENERAL MOTORS CORP., EUCLID DIVISION
General Motors Corp., G.M.C. Truck & Coach Div.
GETMAN BROTHERS MFG. CO.
Hercules Steel Products Co.
Hudson Ltd., Robert
International Harvester Co.
Irwin-Sensenich Corp.
K-W Dart Truck Co.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Koehring Co.
Landis Steel Co.
Letourneau-Westinghouse Co.
MACK TRUCKS INC.
Marmon-Herrington Co., Inc.
Napco Industries, Inc., Federal Motor Truck Div.
Ortruc, Inc.
Rogers Brothers Corp.
Rover Co. Ltd., The
SCOOT-CRETE—see GETMAN BROS. MFG. DIV., INC.
Spencer-Safford Loadcraft
Tournahopper—see Letourneau-Westinghouse Co.
Tournarocker—see Letourneau-Westinghouse Co.
Unit Rig & Equipment
WAGNER MINING SCOOP, INC.
Westinghouse Air Brake Co. (Pa.)
White Motor Co., Autocar Div.
Willys Motors, Inc.

On-Highway

Allison Steel Mfg. Co.
American M.A.N. Corp.
Autocar—see White Motor Co., The, Autocar Trucks Div.
Butler Mfg. Co.
CW—see Curtiss-Wright Corp., South Bend Div.
Chrysler Corp., Dodge Div.
Curtiss-Wright Corp., South Bend Div.
Differential Steel Car Co.
FWD—Four Wheel Drive Auto Co., The
Fruehauf Trailer Co.
Galion Allsteel Body Co.
Gar Wood Industries
General Motors Corp., GMC Truck & Coach Div.
Hercules Galion Products, Inc.
Hercules Steel Products
International Harvester Co.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP.
Koehring Co.
MACK TRUCKS INC.
Napco Industries, Inc., Federal Motor Truck Div.
Rogers Brothers Corp.
Rover Co. Ltd., The
Spencer-Safford Loadcraft
White Motor Co., Autocar Div.
Willys Motors, Inc.
Winter-Weiss Co., The

Selective 4-Wheel Drive Hubs

WARN MFG. CO., INC.

Truck or Trailer Bodies

Allison Steel Mfg. Co.
Athey Products Corp.
Differential Steel Car Co.
Easton Car & Construction Co.
Fruehauf Trailer Co.
Galion Allsteel Body Co.
Gar Wood Industries Inc.
GENERAL MOTORS CORP.
Hercules Galion Products, Inc.
Hercules Steel Products Co.
K-W Dart Truck Co.
Landis Steel Co.
Unit Rig & Equipment Co.
Winter-Weiss Co., The

TUNGSTEN CARBIDE PRODUCTS

Adamas Carbide Corp.
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.

American Brake Shoe Co.
American Coldset Corp.
ATLAS COPCO, INC.
Bedford & Sons Ltd., John
Brunner & Lay, Inc.
Carboloy—see General Electric Co., Metallurgical Prods. Dept.
Christensen Diamond Products Co.
Eutectic Welding Alloys Corp.
FAGERSTA STEEL WORKS CO., LTD.
FAGERSTA STEELS PACIFIC INC.
HUGHES TOOL CO. (BITS)
Intra-Set—see Brunner & Lay, Inc.
Kennametal Inc.
LONGYEAR CO., E. J.
National Carbon Co.
Rok-Bits—see Brunner & Lay, Inc.
Sandvik Steel Inc.
Sheffield Hollow Drill Steel Co. Ltd.
Smit & Co. Inc., Anton
STOODY CO.
Uddeholm Co. of America
U. S. STEEL CORP.
VAREL MANUFACTURING CO.
Vascoloy-Ramet Corp.
WESTERN ROCK BIT MFG. CO.

VACUUM FILTERS

See Filters

VACUUM PUMPS

See Pumps

VALVES

(Covering only companies cataloging this product)
ALLEN-SHERMAN-HOFF PUMP CO., THE
Allis-Chalmers Mfg. Co.
ACF Industries, Inc., American Car & Foundry Div.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
American Chain & Cable Co., Inc., R P & C Valve Div.
Black, Sivalls & Bryson, Inc.
Crane Co.
DENVER EQUIPMENT COMPANY
Duriron Co. Inc., The
ESCO Corp.
Farval Corp., The
FLEX-CHECK—see THE ALLEN-SHERMAN-HOFF PUMP CO.
Flexible Valve Corp.
Foxboro Co., The
Galigher Co., The
Goodrich Co., B. F.
Grinnell Co.
Hazelton—see Barrett, Haentjens & Co.
Hose Accessories Co.
Infilco, Inc.
James Equipment Inc.
KSB Klein, Schanzlin & Becker AG
Kraloy-CH Emtrol Co.
Ledeen Inc.
LINATEX CORP. OF AMERICA
Lunkenheimer Co., The
Massco Grigsby—see Mine & Smelter Supply Co., The
McDowell Co., Inc.
McNally Pittsburgh Co.
MINE & SMELTER SUPPLY CO.
Minneapolis-Honeywell Regulator Co., Industrial Div.
Mission Manufacturing Co.
Ohio Brass Co.
PACIFIC PIPE CO.
Rockwell Manufacturing Co.
United States Rubber Co.
Van Waters & Rogers Inc., Braun Chemical Div.
Victaulic Co. of America
Walworth Co.
WESTERN PRECIPITATION CORP.
Westinghouse Air Brake Co., Industrial Products Div.
Wilkinson Rubber Linatex Ltd.

VENTILATION EQUIPMENT AND BLOWERS

Air Sampler

Staplex Co., The

Brattice Cloth and Tubing

AMERICAN BRATTICE CLOTH CORP.
Bemis Bro. Bag Co.
Goodrich Industrial Products Co., B. F.

Mine Fans and Blowers

ACEC
American Air Filter Co., Inc.
AMERICAN BRATTICE CLOTH CORP.
American Standard, American Blower Div.
Assoc. Electrical Industries Ltd.
AXIVANE—see JOY MANUFACTURING CO.
Brownie—see Sanford-Day Iron Wks.
Buttner Works Inc.
Carrier Corp.
Coppus Engineering Corp.
Dresser Industries Inc., Roots-Connersville Blowers Div.
Drullard Co., Howard
Duriron Co. Inc., The
Fraser & Chalmers Eng. Works
Graybar Electric Co., Inc.
INGERSOLL-RAND CO.
International Engr., Inc.
Jeffrey Mfg. Co.
JOY MANUFACTURING CO.
Koppers Co., Inc.
Mine Safety Appliance Co.
Northern Blower Co.
Robbins & Myers, Inc.
Sanford-Day Iron Wks.
Standard Electric Mfg. Co. Inc.
Textron Inc., Homelite Div.
Toret Manufacturing Co.
U. S. Hoffman Machinery Corp., Industrial Equipment Divs.
Westinghouse Electric Corp.
Westinghouse Electric Corp., Sturtevant Div.

VENTILATION PIPE AND TUBING

AB Alvenius Industries
AMERICAN BRATTICE CLOTH CORP.
Bemis Bro. Bag Co.
Carrier Corp.
COEUR D'ALENES CO., THE
Colonial Plastics Mfg. Co., The, Industrial Div.
DeLaval Steam Turbine Co.
Drullard Co., Howard
du Pont de Nemours & Co., Inc., Fabrics Div.
Flexaust Co.
Flexible Tubing Corp.
GOODRICH CO., THE B. F.
Hanover Industries, Inc.
Jeffrey Mfg. Co.
JOHNS-MANVILLE SALES CORP.
MINE VENT—see AMERICAN BRATTICE CLOTH CORP.
NAYLOR PIPE CO.
NEOLON—see AMERICAN BRATTICE CLOTH CORP.
Spiratube—see Flexible Tubing Corp.
Telluride Iron Wks.
Torit Manufacturing Co.
TRANSITE—see JOHNS-MANVILLE
U. S. Hoffman Machinery Corp., Industrial Equipment Divs.
Ventube—see du Pont de Nemours & Co., Inc., Fabrics Div.

VIBRATORS

See Bins, Chutes and Accessories

WASHERS, LOG

Allis-Chalmers Mfg. Co., Industries Group
American Brake Shoe Co.
Conveyor Corp.
Davis Foundry & Machine Wks.
Eagle Iron Works
GRUENDLER CRUSHER & PULVERIZER CO.
Hirsch Brothers Machinery Co. Inc.
Iowa Mfg. Co.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Engr. Corp.
LAKE SHORE INC.
Link-Belt Co.
Lippmann Engineering Works Inc.
MCLANAHAN CORP.
McNally Pittsburgh Co.
Poor & Co. Inc., Pioneer Engineering Div.
Rogers Iron Works Co.
Scott's Concentrators
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Universal Engr. Corp.
Washington Iron Works
Washington Machinery Co.
WESTERN MACHINERY CO., WEMCO DIV.

WELDING EQUIPMENT, SUPPLIES & SERVICES

Automatic Welding Wire

ACEC
All-State Welding Alloys Co., Inc.
American Brake Shoe Co.
AMPCO Metal Inc.
Assoc. Electrical Industries Ltd.
Auto Arc-Weld Mfg. Co., The
Hobart Brothers Co.
Industrial Air Products Co.
Kenco
Lincoln Electric Co., The
Linde Co. Div., Union Carbide
STOODY COMPANY
United States Steel Corp.
Westfalische Union AG

Equipment

ACEC
Auto Arc-Weld Mfg. Co., The
Assoc. Electrical Industries Ltd.
English Electric Co. Ltd.
Hobart Brothers Co.
Kenco
Lincoln Electric Co., The
STOODY CO.
TWECO Products, Inc.
Union Carbide Corp., National Carbon Co. Div.

General Supplies

American Biltrite Rubber Co. Inc., Boston Woven Hose & Rubber Div.
English Electric Co. Ltd.
Hobart Brothers Co.
Kenco
Lincoln Electric Co., The
Parker Safety Equipment Co.

Hard Facing

Abrasaweld—see Lincoln Electric Co.
Airco—see Air Reduction Sales Co.
Air Reduction Sales Co.
All-State Welding Alloys Co., Inc.
AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO.
AMERICAN BRAKE SHOE CO.
Ampco Metal, Inc.
American Chain & Cable Co. Inc., Page Steel & Wire Div.
Auto Arc Weld Mfg. Co., The
Crucible Steel Co. of America
English Electric Co. Ltd.
Eutectic Welding Alloys Corp.
Fleetwood—see Lincoln Electric Co.
General Electric Co., Apparatus Sales Div.
HARNISCHFEGER CORP.
Hobart Brothers Co.
Industrial Air Products Co.
International Nickel Co., Inc.
Kenco
Kennemetal, Inc.
Lincoln Electric Co., The
Manga-Tone, N-M—see Resisto-Loy Co.
Motor Generator Corp.
RANKIN MFG. CO.
Resisto-Loy Co.
Rexweld—see Crucible Steel Co. of Amer.
Sanford-Day Iron Works, Inc.
STOODY CO.
Stulz-Sickles Co.
Union Carbide & Carbon Corp., Haynes Stellite Co. Div.
Union Carbide and Carbon Corp., Linde Air Products Co. Div.
Wall Colmonoy Corp.
Westfalische Union AG
WESTINGHOUSE ELECTRIC CO.

Welding Rods

Abrasaweld—see Lincoln Electric Co.
Airco—see Air Reduction Sales Co.
Air Reduction Sales Co.
All-State Welding Alloys Co., Inc.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV.
American Chain & Cable Co., Inc., Page Steel & Wire Div.
AMPCO Metal, Inc.
AMPCO-Trode—see AMPCO Metal, Inc.
Amsco—see American Brake Shoe Co.
Assoc. Electrical Industries Ltd.
Bridgeport Brass Co.
Crucible Steel Co. of America
English Electric Co. Ltd.
Eutectic Welding Alloys Corp.
General Electric Co., Apparatus Sales Div.
Goodrich Industrial Products Co., B. F.
HARNISCHFEGER CORP.
Harsco Corp., Taylor-Wharton Co. Div.
Hobart Brothers Co.
Industrial Air Products Co.
International Nickel Co., Inc.
Kenco
Lincoln Electric Co., The
Linde Co.
Ohio Carbon Co., The
STOODY CO.
Stulz-Sickles Co.
Tweco Products, Inc.
Union Carbide Corp., National Carbide Co. Div.
Union Carbide and Carbon Corp., Linde Air Products Co. Div.
U. S. Steel Corp.
Westfalische Union AG
Westinghouse Electric Corp.

WINCHES

See also Hoisting Equipment

Electric

ACEC
Beebe Bros.
Brownie—see Sanford-Day Iron Wks.
Channon Corp., J. H.
CHICAGO PNEUMATIC TOOL CO.
Clyde Iron Works, Inc.
Demag Aktiengesellschaft
Eisenhutte Prinz Rudolph AG
Gar Wood Industries Inc.
HARNISCHFEGER CORP.
Hirsch Brothers Machinery Co. Inc.
INGERSOLL-RAND CO.
JOY MANUFACTURING CO.
LAKE SHORE INC.
Ledeen Mfg. Co.
Link-Belt Co.
Lug-All Co., The
Mobile Drilling, Inc.
Ohio Hoist & Mfg. Co.
Robbins & Myers, Inc.
Round Chain Cos.
Sanford-Day Iron Wks.
Sauerman Bros. Inc.
Shepard Niles Crane & Hoist Corp.
Stephens-Adamson Mfg. Co.
Superior-Lidgerwood-Mundy Corp.
Vulcan Iron Works (Denver)
Westinghouse Electrical Corp.
Yale & Towne Mfg. Co.

Hydraulic

Stanco Mfgs. & Sales Inc.
Superior-Lidgerwood-Mundy Corp.

Portable

Beebe Bros.
Blackhawk Industrial Div.
BOYLES BROS. DRILLING CO.
CHICAGO PNEUMATIC TOOL CO.
Griphoist, Inc.
Holman Bros. Ltd.
JOY MANUFACTURING CO.
Link-Belt Co.
Thor Power Tool Co.

WIRE

See Cable and Conduit

WIRE CLOTH

See Screens, Grizzlies, and Accessories

WIRE ROPE

See Rope, Wire

XANTHATES

See Reagents and Chemicals

YIELDABLE STEEL SETS

See Steel

Manufacturers' complete names and addresses are listed on the last pages of this yellow section. Advertisers in this issue are listed in boldface capital letters

Section II

MANUFACTURERS' INDEX

Section II contains an alphabetical list of the names and complete addresses of the principal manufacturers of specialized mine-mill-smelter equipment. The names of manufacturers who are represented in this issue by catalogs or advertisements are printed in boldface type.

A

A & A Mfg. Co., Inc., 712 So. 12th St., Milwaukee 4, Wis.
ABCs Scale Div., McDowell Co., Inc., 16360 Waterloo Rd., Cleveland 10, Ohio
ACEC, (Ateliers de Constructions Electriques de Charleroi,) B.P. No. 254, Charleroi, Belgique
Abrams Aerial Survey Corp., 606 E. Shiawassee St., Lansing 1, Mich.
A.C.F. Industries, Inc., American Car & Foundry Div., 30 Church St., N.Y. 8, N.Y.
ACKER DRILL CO., INC., P.O. BOX 830, SCRANTON 3, PA.
Adamas Carbide Corp., 121 Market St., Kenilworth, N.J.
Advance Car Mover Co., Inc., 112 N. Outagamie St., Appleton, Wis.
Aero Service Corp., 210 E. Courtland St., Philadelphia 30, Pa.
AERO Service Corp.—Western, 137 W. 9th South, Salt Lake City 1, Utah
Ainsworth & Sons, Inc., Wm., 2151 Lawrence St., Denver 5, Colo.
AIR PLACEMENT EQUIP. CO., 1000 W. 24TH ST., KANSAS CITY 8, MO.
Air Reduction Sales Co., 150 East 42nd St., New York 17, N.Y.
ALCO Products, Inc., Dept. 919, PO Box 1065, Schenectady 1, N.Y.
Alcoa, Rome Cable Div., Ridge St., Rome, N.Y.
Aldon Company, The, 3338 Ravenswood Ave., Chicago 13, Ill.
ALIMAK CORPORATION, 913 AIRPORT BLVD., SOUTH SAN FRANCISCO, CALIF.
Allen & Garcia Co., 332 S. Michigan Ave., Chicago 4, Ill.
ALLEN-SHERMAN-HOFF PUMP CO., THE, P.O. BOX 635, PAOLI, PA.
Alliance Machine Co., Alliance, Ohio
Allied Chemical Corp., 40 Rector St., New York 6, N.Y.
Allied Geophysics, P.O. Box 583, San Jose 6, Calif.
Allied Steel & Tractor Products Inc., 7835 Broadway, Cleveland 5, Ohio
Allied Witan Co., Inc., 12500 Bellaire Rd., Cleveland 35, Ohio
Allis-Chalmers Mfg. Co., Engine-Material Handling Div., 1135 S. 70th St., Milwaukee 14, Wis.
Allis-Chalmers Mfg. Co., Industries Group, Milwaukee 1, Wis.
Allis-Chalmers Mfg. Co., Construction Machy. Div., Box 512, Milwaukee 1, Wis.
Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.
Allison Steel Mfg. Co., P.O. Box 6067, Phoenix, Ariz.
ALLOY STEEL & METALS CO., 1848 EAST 55TH ST. (PO BOX 58323 VERNON STATION), LOS ANGELES 58, CALIF.
All-State Welding Alloys Co., Inc., 249-55 Ferris Ave., White Plains, N.Y.
Alphaduct Wire & Cable Co., P.O. Box 709, New Brunswick, N.J.
Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.
AB Alvenius Industrier, Kungsgaten 75, Eskilstuna, Sweden
Amercoat Corp., 4809 Firestone Blvd., Southgate, Calif.
American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.
American Biltrite Rubber Co., Inc., Boston Woven Hose & Rubber Div., P.O. Box 1071, Boston 3, Mass.
American Brake Shoe Co., 530 5th Ave., New York 36, N.Y.
American Brake Shoe Co., Ramapo Ajax Div., Export Div., 230 Park Ave., New York 17, N.Y.
AMERICAN BRAKE SHOE CO., AMERICAN MANGANESE STEEL DIV., 389 E. 14TH ST., CHICAGO HEIGHTS, ILL.
AMERICAN BRATTICE CLOTH CORP., 230 S. BUFFALO ST., P.O. BOX 187, WARSAW, IND.
American Chain & Cable Co., Helicord Gage Div., Bridgeport 2, Conn.
American Chain & Cable Co., Inc., American Cable Div., York, Pa.
American Chain & Cable Co., Inc., American Chain Div., 454 E. Princess St., York, Pa.
American Chain & Cable Co., Inc., Wilkes-Barre, Pa., USA
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Chain & Cable Co., Inc., R-P & C Valve Div., Tulpehocken St., Reading, Pa.
American Chain & Cable Co., Inc., Wright Hoist Div., 735 Hay St., York, Pa.
American Coldset Corp., U.S. Highway 46, Teterboro, N.J.
AMERICAN CYANAMID CO., EXPLOSIVES AND MINING CHEMICAL DEPT., 111 W. 40TH ST., NEW YORK 18, N.Y.
AMERICAN CYANAMID CO., MINERAL DRESSING DEPT., 30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.
American Hoist & Derrick Co., 63 So. Robert, St. Paul 7, Minn.
American Hoist & Derrick Co., Crosby-Laughlin Div., 2511 Taylor St., Ft. Wayne, Ind.
American LaFrance, 100 E. LaFrance St., Elmira, N.Y.
American Locomotive Co., 30 Church St., N.Y., N.Y.
American Machine & Metals, Inc., Filtration Engineers Div., East Moline, Ill.
American M.A.N. Corp., 500 5th Ave., New York 36, N.Y.
AMERICAN MANGANESE STEEL DIVISION, 389 E. 14TH ST., CHICAGO HEIGHTS, ILL.
AMERICAN MINE DOOR CO., 2071 DUEBER AVE., S. W., CANTON 6, OHIO
American Optical Company, Safety Products Div., 56 Mechanic St., Southbridge, Mass.
American Potash & Chemical Corp., 3000 W. 6th St., Los Angeles 54, Calif.
American Rubber Mfg. Co., The, 1145 Park Ave., Oakland 8, Calif.
AMERICAN SMELTING & REFINING CO., CRANDALL BLDG., SALT LAKE CITY, UTAH
American Standard Corp., American Blower Corp. Div., Detroit 32, Mich.
American Steel Foundries, 3761 Canal St., E. Chicago, Ind.
American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif.
AMERICAN ZINC SALES CO., 1630 PAUL BROWN BLDG., ST. LOUIS, MO.
Ampco Metal, Inc., 1716 South 38th St., Milwaukee 46, Wis.
Anaconda Wire & Cable Co., 25 Broadway, New York City 4, N.Y.
Analytical Measurements, Inc., 585 Main St., Chatham, N.J.
Apache Powder Co., Box 518, Benson, Arizona
Appleton-Atlas Car Mover Corp., 1421-25 S. 2nd St., Milwaukee 4, Wis.
Archer-Daniels-Midland Co., 700 Investors Bldg., Minneapolis 2, Minn.
Arizona Assay Office, 815 N. 1st St., P.O. Box 1148, Phoenix, Ariz.
Arizona Bag Co., 1502 So. 23rd Ave., Phoenix, Ariz.
ARIZONA TESTING LABORATORIES, 817 WEST MADISON ST., PHOENIX, ARIZ.
Armco Steel Corp., National Supply Div., P.O. Box 416, Pittsburgh 30, Pa.
Armco Steel Corp., Union Wire Rope Div., 21st & Manchester Ave., Kansas City 26, Mo.
Armour Alliance Industries, 16123 Armour St. N.E., Alliance, Ohio
Armour Chemical Div., 1355 W. 31st St., Chicago 9, Ill.
Armstrong-Bray & Co., 5364-5378 Northwest Highway, Chicago 30, Ill.
ASEA ELECTRIC INC., 500 FIFTH AVE., N.Y.C. 36, N.Y.
Assoc. Electrical Industries Ltd., 33 Grosvenor Pl., London S.W. 1, England
Athey Products Corp., 5631 W. 65th St., Chicago 38, Ill.
Atkins Technical Inc., 1276 W. 3rd St., Cleveland 13, Ohio
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland 10, Ohio
ATLAS COPCO, INC., 545 FIFTH AVE., NEW YORK 17, N.Y.
Atlas Powder Co., Wilmington 99, Dela.
Auto Arc-Weld Mfg. Co., The, 9615 Meech Ave., Cleveland 5, Ohio

B

B-I-F Industries, Inc., 345 Harris St., Providence, R.I.
B-R-D Co. Ltd., Dumbleberry Lane, Aldridge, NR, Walsall, Staffs, England
Babcock & Wilcox Co., Boiler Div., The, 161 E. 42nd St., New York 17, N.Y.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio
Baldwin-Lima-Hamilton Corp., Eddystone Div., Philadelphia 42, Pa.
BALDWIN-LIMA-HAMILTON CORP., LIMA DIV., PHILADELPHIA 42, PA.
Band-It Co., 4799 Dahlia, Denver 16, Colo.
Barber-Colman Co., Industrial Instruments Div., 1300 Rock St., Rockford, Ill.
Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.
BARBER-WEBB CO., 3864 SANTA FE AVE., LOS ANGELES 58, CALIF.
Barco Mfg. Co., 500-530 N. Hough St., Barrington, Ill.
Barrett, Haentjens & Co., P.O. Box 36, Hazleton, Pa.
Basic Products Corp., Hevi-Duty Electric Co. Div., 304 Hart St., Watertown, Wis.
Bath Iron Works Corp., Pennsylvania Crusher Div., 323 S. Matlack St., West Chester, Pa.
Baukol, Philip J., 2054 University Ave., Berkeley, Calif.
Bausch & Lomb Inc., 68261 Bausch St., Rochester 2, N.Y.
Bay City Shovels, Inc., 2611 Center Ave., Bay City, Mich.
Bean Div., John—see Food Machinery & Chemical
BEAN DIV., JOHN—see FOOD MACHINERY & CHEMICAL CORP.
Beckman Instruments, Inc., Scientific Instruments Div., 2500 Fullerton Rd., Fullerton, Calif.
Bedford & Sons Ltd., John, Lion Works, Sheffield 3, England
Beebe Bros., 2724 Sixth Ave. S., Seattle 4, Wash.
Bell Helicopter Corp., P.O. Box 482, Ft. Worth 1, Tex.
Bemis Bro. Bag Co., 111 YN. 4th St., St. Louis 2, Mo.
Bendelari, F.N., P.O. Box 123, Joplin, Mo.
Bendix Aviation Corp., Cincinnati Div., 3130 Wasson Rd., Cincinnati 4, Ohio
Bendix Corp., The, Bendix Computer Div., 5630 Arbor Vitae, Los Angeles 45, Calif.
Benoto, Inc., 229 Michigan Ave., Chicago, Ill.
Berger & Sons, Inc., C. L., 37 Williams St., Boston 19, Mass.
Berk & Co., Inc., F. W. 275 Brannan St., San Francisco 7, Calif.
Berk & Co., F. W., Park Place East, Wood-Ridge, N.J.
Bethlehem Steel Co., 701 E. Third St., Bethlehem, Pa.
Bico, Inc., 3116 Valhalla Dr., Burbank, Calif.
Bin-Dicator Co., The, 13946 Kercheval Ave., Detroit 15, Mich.
Bird Machine Co., South Walpole, Mass.
Birdsboro Corp., Birdsboro, Pa.
Bixby-Zimmer Engr. Co., 961 Abingdon St., Galesburg, Ill.
Black & Deason, Box 1888, Salt Lake City 1, Utah
Black, Sivalls & Bryson Inc., 7500 E. 12th St., Kansas City 26, Mo.
Blackhawk Industrial Div., Butler, Wis.
Blaw-Knox Co., Blaw-Knox Div., Farmers Bank Bldg., Pittsburgh, Pa.
Bochumer Eisenhutte Heintzmann & Co., Blucherstrasse 33, Bochum, Germany
Bonded Scale & Machine Co., 2173 S. 3rd St., Columbus 7, Ohio
Booklime, Inc., 3735 S. 3100 East St., Salt Lake City 9, Utah
Booth Co., Inc., The, 333 W. 14th So. St., Salt Lake City 15, Utah

Borg-Warner Ind.—see Morse Chain Co., N.Y.
BOULDER SCIENTIFIC CO., 250 PEARL ST., BOULDER, COLO.
Bowdil Co., The, Canton, Ohio
BOYLES BROS. DRILLING CO., 1624 PIONEER RD., SALT LAKE CITY, UTAH
BOYLES BROS. DRILLING CO., LTD., 1275-91 PARKER ST., VANCOUVER 6, B.C., CANADA
Braun & Co., C. F., 1000 S. Fremont Ave., Alhambra, Calif.
Braun Chemical Co., 1363 S. Bonnie Beach Place, Los Angeles 54, Calif.
Braun Corp., 2260 E. 15th St., Los Angeles 21, Calif.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Briggs & Stratton Corp., 2711 N. Thirteenth St., Milwaukee 1, Wis.
Bristol Co., The, P.O. Box 1790 MW Waterbury 20, Conn.
British Insulated Callender's Cables, Ltd., 21 Bloomsbury St., London W.C. 1, England
British Ropes Ltd., Export Sales Div., 52 High Holborn, London, England
British Ropeway Engineering Co., Ltd., Plantation House, Mincing Lane, London E.C. 3, England
Broderick & Bascom Rope Co., 4203 N. Union Blvd., St. Louis 15, Mo.
Brown Inc., David, 999 Beecher St., San Leandro, Calif.
Brunner & Lay, Inc., W. 9300 King St., Franklin Park, Ill.
Buck & Associates, Carl, Essex Falls, N.J.
Bucyrus-Erie Co., P.O. Box 56, South Milwaukee, Wis.
Bucyrus-Erie Co., Drill Div., P.O. Box 324, Richmond, Ind.
Buell Engineering Co., Inc., 123 William St., New York 38, N.Y.
Bullard Co., E. D., 2680 Bridgeway, Sausalito, Calif.
BURBRIDGE-PYBURN, RM. 414, MILLS BLDG., EL PASO, TEX.
Burroughs Corp., Detroit 32, Mich.
Bush Engineering & Mfg. Co., 344 W. 8th So. St., Salt Lake City 1, Utah
Butler Mfg. Co., 7400 E. 13th St., Kansas City 26, Mo.
Buttner Works Inc., 52 Vanderbilt Ave., New York 17, N.Y.
Byron Jackson Pumps, Inc., Subsidiary of Borg-Warner Corp., P.O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

C

C & D Batteries, Inc., Washington & Cherry Sts., Conshohocken, Pa.
Calumet & Hecla, Inc., Calumet Div., 1 Calumet Ave., Calumet, Mich.
Canada Wire & Cable Co., Ltd., P. S. "R," Toronto 17, Ontario, Canada
Canadian Aero Service Ltd., 348 Queen St., Ottawa 4, Ontario, Canada
Canadian Safety Fuse Co. Ltd., Brownsburg, Quebec, Canada
Carbolineum Wood Preserving Co., 6683 N. 40th St., Milwaukee 9, Wis.
Carborundum Co., The, Refractories Div., Perth Amboy, N.J.
CARD IRON WORKS CO., THE C. S., P.O. BOX 117, 2501 W. 16TH AVE., DENVER 1, COLO.
Cardinal Scale Mfg. Co., 203 E. Daugherty, Webb City, Mo.
Cardox Corp., 307 N. Michigan Ave., Chicago, Ill.
Carlon Products Corp., 10225 Meech Ave., Cleveland 5, Ohio
Carlyle Rubber Co., Inc., 103-107 Warren St., New York 7, N.Y.
Carol Cable Co., 190 Middle St., Pawtucket, R.I.
Carpco Mfg. Inc., 4120 Haines St., Jacksonville 6, Fla.
Carrier Corp., Carrier Parkway, Syracuse, N.Y.
Carrier Conveyor Corp., 211 N. Jackson St., Louisville 2, Ky.
Carey Mfg. Co., The Philip, 320 S. Wayne Ave., Cincinnati 15, Ohio
Caterpillar Tractor Co., Abington & Perry, Peoria, Ill.
Cement Gun Co., Allentown, Pa.
Central Frog & Switch Co., The, Box 95, Sta. O, Cincinnati 8, Ohio
Central Mine Equipment Co., 6200 N. Broadway St. Louis 15, Mo.
Central Scientific Co. of Calif., 1040 Martin Ave., Santa Clara, Calif.
Centrifugal & Mechanical Industries, Inc., 146 President St., St. Louis 18, Mo.
Chain Belt Co., 4701 W. Greenfield Ave., Milwaukee 1, Wis.
J. H. Channon Corp., 1447-55 W. Hubbard St., Chicago 22, Ill.
CHAPMAN, WOOD & GRISWOLD, P.O. BOX 8302, ALBUQUERQUE, N.M.
Chase Brass & Copper Co., 236 Grand St., Waterbury 20, Conn.
Chicago Eye Shield Co., 2727 W. Roscoe St., Chicago 18, Ill.
CHICAGO PNEUMATIC TOOL CO., 6 E. 44TH ST., NEW YORK 17, N.Y.
Christensen Diamond Products Co., 1937 S. 2nd West, P.O. 387, Salt Lake City, Utah
Chrysler Corp.—Dodge Div., 21500 Mound Rd., Detroit 31, Mich.
Circle Wire & Cable Corp., 5500 Maspeth Ave., Maspeth 78, N.Y.
Clark Equipment Co., Construction Machinery Div., P.O. Box 599, Pipestone Plant, Benton Harbor, Mich.
Cleveland Rock Drill Div., Westinghouse Air Brake Co., Cleveland, Ohio
Cleveland Vibrator Co., The, 2828 Clinton Ave. W., Cleveland 13, Ohio
Cleveland Wire Cloth & Mfg. Co., 3573 E. 78th St., Cleveland 5, Ohio
Climax Molybdenum Co., 500 Fifth Ave., N.Y. 36, N.Y.
Clinton Engines Corp., Maquoketa, Iowa
Clipper Belt Lacer Co., 974 Front Ave., N.W., Grand Rapids 2, Mich.
Clyde Iron Works, Inc., Duluth 1, Minn.
COAST MFG. & SUPPLY CO., BOX 1, LIVERMORE, CALIF.
COATES STEEL PRODUCTS CO., P.O. BOX 185, 1937 FRANKLIN AVE., GREENVILLE, ILL.
COEUR D'ALENES, CO., THE, BOX 969, WALLACE, IDAHO
Coffing Hoist Div., Duff Norton Co., Danville, Ill.
COLEMAN CABLE & WIRE CO., 1900 RIVER RD., RIVER GROVE, ILL.
Collier Carbon & Chemical Corp., 714 W. Olympic Blvd., Los Angeles 15, Calif.
Collins Radio, P.O. Box 1891, Dallas, Tex.
Collyer Insulated Wire Co., 249 Roosevelt Ave., Box 61, Pawtucket, R.I.
Colonial Plastics Mfg. Co., Industrial Div., 2685 E. 79th St., Cleveland 4, Ohio
COLORADO ASSAYING CO., THE, 2244 BROADWAY, DENVER 1, COLO.
COLORADO FUEL & IRON CORP., P.O. BOX 1920, DENVER 1, COLO.
COLORADO FUEL & IRON CORP., THE, JOHN A. ROEBLING'S SONS DIV., 640 S. BROAD ST., TRENTON 2, N.J.
COLUMBIA STEEL CASTING CO., INC., 933 N.W. JOHNSON ST., PORTLAND 9, ORE.
Combustion Engineering Inc., Raymond Div., 1132 W. Blackhawk St., Chicago 22, Ill.
Combustion Engineering, Inc., Raymond Div., 200 Madison Ave., New York 16, N.Y.
Commercial Shearing & Stamping Co., 1775 Logan Ave., P.O. Box 239, Youngstown 1, Ohio
Connecticut Telephone & Electric Corp., Meriden, Conn.
Connellsville Corp., P.O. Box 677, Connellsville, Pa.
Consolidated Metal Products, Inc., 1028 Depot St., Cincinnati 4, Ohio
Continental Conveyor & Equip. Co., Box 3142, Birmingham 12, Ala.
Convair, P.O. Box 9671, Pittsburgh 26, Pa.
Conveyor Co., The, 3260 E. Slauson Ave., Los Angeles 58, Calif.
Cooper-Bessemer Corp., The, Mount Vernon, Ohio
Coppus Engineering Corp., 344 Park Ave., Worcester 10, Mass.
COWIN & CO., INC., 1-18TH ST., S.W., BIRMINGHAM 11, ALA.
Craig Carroll Co., P.O. Box 2128, Portland 14, Ore.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crescent Belt Fastener Co., 381-4th Ave., New York 16, N.Y.
Crown Zellerbach Corp., Chem. Products Div., Camas 99, Wash.
Crucible Steel Co. of America, P.O. Box 88, Pittsburgh 30, Pa.
Cummins Engine Co., Inc., 1000 Fifth, Columbus, Ind.
Curta Co., 14435 Cohasset St., Van Nuys, Calif.
Curtiss-Wright Corp., South Bend Div., 701 W. Chippewa Ave., South Bend, Ind.
Curtiss-Wright Corp., Utica Div., Utica, Mich.
Custom Assay Office, Box 811, El Paso, Tex.

D

Dale, Wade M., 238 E. Polk St., Coalinga, Calif.
Davey Compressor Co., 600 Franklin Ave., Kent, Ohio
Davis Foundry & Machine Wks., P.O. Box 426, Rome, Ga.
Davis, Leland J., 2060 Ribbon Lane, Salt Lake City, Utah
Daystrom Inc., Weston Instr. Div., 614 Freylinghuysen Ave., Newark 12, N.J.
Dayton Rubber Co., Woodside Bldg., Greenville, S.C.
John Deere, 3300 River Dr., Moline, Ill.
Deggendorfer, T. G., Box 840, Kellogg, Idaho
DEISTER CONCENTRATOR CO. INC., THE, 925 GLASGOW AVE., FORT WAYNE, IND.
Deister Machine Co., 1933 E Wayne St., Ft. Wayne 4, Ind.
Demag Aktiengesellschaft, Wolfgang-Reuter-Platz, Duisburg, Germany
Deming Co., The, South Broadway, Salem, Ohio
DENVER EQUIPMENT CO., 1400-17TH ST., DENVER 17, COLO.
Denver Fire Clay Co., P.O. Box 5510, Denver 17, Colo.
DESOUSA & CO., J. E., INC., 217 BROADWAY, NEW YORK, N.Y.
Diamond Chain Co., Inc., 402 Kentucky Ave., Indianapolis 7, Ind.
DIAMOND DRILL CONTRACTING CO., N. 1015 YARDLEY RD., BOX 136, YARDLEY, SPOKANE, WASH.
DIAMOND TOOL RESEARCH CO., INC., 380 2ND AVE., N.Y. 10, N.Y.
Dicalite Div., Great Lakes Carbon Corp., 612 S. Flower St., Los Angeles, Calif.
Dickinson Laboratories, Inc., Box 7006, El Paso, Tex.
DIESEL ENERGY CORP.,—SEE KLOCKNER-HUMBOLDT-DEUTZ
Dietzgen Co., Eugene, 2425 N. Sheffield Ave., Chicago 14, Ill.
Differential Steel Car Co., Findlay, Ohio
Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46, Wis.
Dodge Manufacturing Corp., S. Union St., Mishawaka, Ind.
Dorman & Co., Ltd., W.H.—see Fairbanks-Morse & Co., 900 W. Mount St., Connersville, Ind.
DORR-OLIVER INC., 77 HAVEMEYER LANE, STAMFORD, CONN.
Dow Chemical Co., The, Midland, Mich.
Dowty Mining Equipment Ltd., Ashchurch, Tewkesbury, Glos., England
Dravo Corp., Neville Island, Pittsburgh 25, Pa.
Dresser Industries, Inc., Roots-Connersville Blower Div., 900 W. Mount St., Connersville, Ind.
Drilling Accessory & Mfg. Co., Inc., P.O. Box 5768, 2006 S. Industrial Blvd., Dallas, Tex.
Drott Manufacturing Corp., 3126 S. 27th St., Milwaukee 15, Wis.
Drullard Co., Howard, 21026 Folsom St., San Francisco 3, Calif.
Ducon Co., Inc., The, 152 E. 2nd St., Mineola, N.Y.
Dumont Laboratories, Inc., Allen, 750 Bloomfield Ave., Clifton, N.J.
duPont de Nemours & Co., E. I. Chemicals Dept., duPont Bldg., Wilmington, Dela.
duPont de Nemours & Co. Inc., Explosives Div., Wilmington 98, Dela.
duPont de Nemours & Co., Inc., Fabrics Div., Newburgh, N.Y.
Duriron Co. Inc., The, P.O. Box 1019, Dayton 1, Ohio

E

Eagle Crusher Co., 900 Harding Way E., Galion, Ohio
Eagle Iron Works, 261 Holcomb Ave., Des Moines, Iowa
Eastern Malleable Iron Co., Eastern Sales Co. Div., 4700 Clairton Blvd., P.O. Box 10821, Pittsburgh 36, Pa.
Easton Car & Construction Co., Easton, Pa.
Eaton Manufacturing Co., Cleveland Worm & Gear Div., 3300 E. 80th St., Cleveland 4, Ohio
Eaton Manufacturing Co., Dynamatic Div., 3122 14th Ave., Kenosha, Wis.
Eaton Manufacturing Co., Farval Div., 3300 E. 80th St., Cleveland 4, Ohio
Eberline Instrument Corp., 805 Early St., P.O. Box 279, Santa Fe, N.M.
Economy Fuse & Mfg. Co., 2717 Greenview Ave., Chicago, Ill.
Edison, Inc., Thomas A., Edison Storage Battery Div., West Orange, N.J.
Edwards Co., E. H., Butler Rd. & Industrial Way, So. San Francisco, Calif.
Eimco Corp., P.O. Box 300, Salt Lake City 10, Utah
Electric Autolite Co., The, C & D Batteries Div., Washington & Cherry Sts., Conshohocken, Pa.
El Paso Testing Labs., Ltd., P.O. Box 1565, 2217 Texas St., El Paso, Tex.
Electric Controller & Mfg. Co., 4514 Lee Rd., Cleveland 28, Ohio
Electric Machinery Mfg. Co., 800 Central Ave., Minneapolis 13, Minn.
ELECTRIC STORAGE BATTERY CO., EXIDE INDUSTRIAL DIV., RISING SUN & ADAMS AVES., PHILADELPHIA 20, PA.
Elektrokemisk A. S., 101 Park Ave., New York 17, N.Y.
Elliott, D. H., P.O. Box 12361, Tucson, Ariz.
ELLICOTT MACHINE CORP., 1611 BUSH ST., BALTIMORE 30, MD.
Elreco Corp., The, 2000 Central Ave., Cincinnati 14, Ohio
Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio
English Electric Co. Ltd., The English Electric House, Strand, London W.C.2, England
English Electric Export & Trading Co., Ltd., Stafford, England
Ensign Bickford Co., P.O. Box 308, Simsbury, Conn.
Enterprise Eng. & Mach. Co., 18th & Florida St., San Francisco 10, Calif.
EQUIPMENT ENGINEERS INC., 737 LOMA VERDE, PALO ALTO, CALIF.
Erie Pump & Engine Works, 165 Glenwood Ave., Medina, N.Y.
Eriez Manufacturing Co., 291 Magnet Dr., Erie, Pa.
ESCO Corp., 2141 N.W. 25th Ave., Portland, Ore.
Essex Wire Corp., 1601 Wall Street, Fort Wayne 6, Ind.
Essex Wire Corp., Industrial Wire Prods. Wire & Cable Div., 2601 So. Adams, Marion, Ind.
Essex Wire Corp., Paranite Wire & Cable Div., 2601 S. Adams St., Marion, Ind.
Esterline-Angus Instrument Co., Inc., P.O. Box 596, Indianapolis 6, Ind.
EUCLID DIV.—SEE GENERAL MOTORS CORP.
Euclid Electric & Mfg. Co., 50 Edwards St., Madison, Ohio

Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N.Y.
Evans Pipe Co., The, Evanite Plastic Co. Div., Carollton, Ohio
Exolon Co., The, E. Niagra St., Tonawanda, N.Y.

F

FAGERSTA STEEL WORKS CO., LTD., 405 LEXINGTON AVE., NEW YORK 17, N.Y.
FAGERSTA STEELS PACIFIC INC., 1011 E. 61ST ST., LOS ANGELES 1, CALIF.
Failing Co., Geo. E., 424 E. Broadway, Enid, Okla.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairbanks, Morse & Co./Dorman & Co. Ltd., 600 S. Michigan Ave., Chicago 5, Ill.
Fairchild Aerial Surveys, 224 E. 11th St., Los Angeles 15, Calif.
Fairchild Camera & Instrument Corp., Allen B. DuMont Labs. Div., 750 Bloomfield Ave., Clifton, N.J.
Falk Corp., The, Box 492, Milwaukee 1, Wis.
Farris Flexible Valve Corp., 400 Commercial Ave., Palisades Park, N.J.
Farval Corp., The, 3300 E. 80th St., Cleveland, Ohio
Fate-Root-Heath Co., The, Plymouth Locomotive Wks. Div., Plymouth, Ohio
Fennel Sohne K.G., Otto., 16 Konigstor, Kassel, W. Germany
Fielden Electronics Ltd., Paston Rd., Wythenshawe, Manchester 22, England
Filter Fabrics, Inc., 1279 W. 3rd St., Cleveland 13, Ohio
Filtration Engineers Div., American Machine & Metals, Inc., East Moline, Illinois
Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron 17, Ohio
Firth Sterling Inc., 3113 Forbes Ave., Pittsburgh 30, Pa.
Fisher & Ludlow, Ltd., Mining Equip. Div., Bordesley Works, Birmingham 12, England
Fischer & Porter Co., Warminster, Pa.
Fisher Contracting Co., P.O. Box 6537, Phoenix, Ariz.
Flexaust Co., 100 Park Ave., New York 17, N.Y.
Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill.
Flexible Tubing Corp., New Whitfield St., Guilford, Conn.
Flexible Valve Corp., 400 Commercial Ave., Palisades Park, N.J.
Fluidwick Co., 5319 Outer Dr., Detroit 34, Mich.
Flygt Corp., Hoosick Falls, N.Y.
FOOD MACHINERY & CHEMICAL CORP., JOHN BEAN DIV., P.O. BOX 145, SAN JOSE 3, CALIF.
Food Machinery & Chemical Corp., Peerless Pump Div., 301 West Avenue 26, Los Angeles, Calif.
Ford Motor Co., Ford Division, P.O. Box 658, Dearborn, Mich.
Foster Wheeler Corp., 666 Fifth Ave., New York 19, N.Y.
Four Wheel Drive Corp., 12th St., Clintonville, Wis.
Foxboro Co., The, 38 Neponset Ave., Foxboro, Mass.
Frantz Co. Inc., S. G., P.O. Box 1138, Trenton 6, N.J.
Frederick, Francis H. & Associates, 615 Kohl Bldg., 400 Montgomery St., San Francisco 4, Calif.
Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Mich.
Fuller Mfg. Co., Kalamazoo, Mich.

G

Galigher Co., The, 545-585 W. 8th South St., P.O. Box 209, Salt Lake City 10, Utah
Galion Allsteel Body Co., 605 S. Market St., Galion, Ohio
Gar Wood Industries, Inc., 36253 Michigan Ave., Wayne, Mich.
Gardner & Co., Ralph C., 14112 Lima Rd., Ft. Wayne, Ind.
GARDNER-DENVER CO., GARDNER EXPRESSWAY, QUINCY, ILL.
Garlock Packing Co., 402 Main St., Palmyra, N.Y.
Gates Rubber Co., 999 S. Broadway, Denver 17, Colo.
Gatke Corp., 228 N. LaSalle St., Chicago 1, Ill.
Gebruder Hischmann Maschinenfabrik, (21a) Ennigerloh, Westfalen, W. Germany
General Aniline & Film Corp., Ozalid Div., Ozalid Rd., Johnson City, N.Y.
GENERAL CABLE CORP., 730 THIRD AVE., NEW YORK 17, N.Y.
General Dynamics Corp., Electro Dynamic Div., 163 Ave. A, Bayonne, N.J.
General Electric Co., Apparatus Sales Div., 1 River Rd., Schenectady 5, N.Y.
General Electric Co., Carboloy Dept., Box 237, Roosevelt Park Place, Detroit 32, Mich.
General Electric Co., Circuit Protective Devices Dept., 41 Woodford Ave., Plainville, Conn.
General Electric Co., Lamp Dept., Nela Park, E. Cleveland 12, Ohio
General Electric Co., Metallurgical Products Dept., Box 237, Roosevelt Park Annex, Detroit 32, Mich.
General Electric Co., Wire & Cable Dept., 1285 Boston Ave., Bridgeport 2, Conn.
General Equipment Co., Box 134, Owatonna, Minn.
General Fire Extinguisher Corp., 25631 Little Mack, St. Clair Shores, Mich., & 8740 Washington Blvd., Culver City, Calif.
General Hardwood Co., Milwaukee Waterway at E. 11 St., Tacoma, Wash.
General Machinery Co., 3500 Riverside Ave., Spokane, Wash.
General Mills, Inc., Chemical Div., So. Kensington Rd., Kankakee, Ill.
General Mills, Inc., Special Commodities Div., 9200 Wayzata Blvd., Minneapolis 26, Minn.
General Motors Corp., Allison Div., P.O. Box 894, Indianapolis 6, Ind.
General Motors Corp., Delco Products Div., 329 E. First St., Dayton, Ohio
General Motors Corp., Detroit Diesel Engine Div., 13400 W. Otter Dr., Detroit 28, Mich.
General Motors Corp., Electro-Motive Div., La Grange, Ill.
GENERAL MOTORS CORP., EUCLID DIV., 1361 CHARDON RD., CLEVELAND 17, OHIO
General Motors Corp., GMC Truck & Coach Div., 660 S. Blvd., E. Pontiac 11, Mich.
General Motors Corp., New Departure Div., 269 N. Main St., Bristol, Conn.
General Petroleum Corp., 612 S. Flower St., Los Angeles, Calif.
General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.
General Splice Corp., 32 Woodsworth Ave., Yonkers, N.Y.
General Tire & Rubber Co., Akron 1, Ohio
Geodynamics, Inc., P.O. Box 1258, Santa Monica, Calif.
Geo-Optic Co., Inc., 170 Broadway, New York 38, N.Y.
Geophysical Explorations Ltd., c/o Nesbitt, 525 Seymour St., Vancouver B.C., Canada
Geo-Optic & Paper Corp., 149 Church St., New York 7, N.Y.
Geophysical Service, Inc., 900 Exchange Bank, Dallas 35, Tex.
Geophysical Specialties Co., 15409 Robinwood Dr., Hopkins, Minn.
GETMAN BROTHERS MFG. CO., INC., P.O. BOX 71, SOUTH HAVEN, MICH.
Godoy & Co., Inc., E. A., Cunard Bldg., 25 Broadway, New York 4, N.Y.
Goodall Brothers, Assayers, Box 537, 46 S. Main St., Helena, Mont.
GOODALL RUBBER CO., 430 WHITEHEAD RD., TRENTON, N.J.
Goodman Manufacturing Co., Halsted St. & 48th Pl., Chicago 9, Ill.
Goodman Manufacturing Co., Diamond Iron Works Div., Halsted St. & 48th Pl., Chicago 9, Ill.
Goodman Manufacturing Co., Mancha Storage Battery Locomotive Div., Halsted St. & 48th Pl., Chicago 9, Ill.
Goodrich Industrial Products Co., B. F., 500 S. Main St., Akron, Ohio
Goodrich Tire Co., B.F., 500 S. Main St., Akron, Ohio
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, Ohio
Gorman-Rupp Co., The, 805 Bowman St., Mansfield, Ohio
Gould & Co., Gordon I., 58 Sutter St., San Francisco 4, Calif.
Gould-National Batteries, Inc., Trenton 7, N.J.
Granby Mining Co. Ltd., Allenby Foundry Div., Allenby, B.C., Canada
Graphite Metallizing Corp., 1090 Nepperhan Ave., Yonkers, N.Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N.Y.
Great Lakes Carbon Corp., Mining & Mineral Prods. Div., 612 S. Flower St., Los Angeles 17, Calif.
Greening & Sons Ltd., N., P.O. Box 22, Britannia Works, Warrington, England
Greensburg Div., National Mine Service Co., 102 Stanton St., Greensburg, Pa.
Grinnell Co., 260 W. Exchange St., Providence 1, R.I.
GRIPHOIST INC., 744 HARRISON ST., SAN FRANCISCO 7, CALIF.
GRUENDLER CRUSHER & PULVERIZER CO., 2915 N. MARKET ST., ST. LOUIS 6, MO.
Gulf Oil Corp., Dept. D.M., Gulf Bldg., Houston 2, Tex.
Gundlach Machine Co., Div., T. J., J. M. J. Industries, Inc., 226 Centerville Ave., Belleville, Ill.
Gurley, W. & L. E., 514 Fulton St., Troy, N.Y.
Gustin Bacon Mfg. Co., W. 10th St., Kansas City, Mo.

H

Hack Engineering Co., 124 Wazee Market, Denver, Colo.
Halliburton Oil Well Cementing Co., Duncan, Okla.
Halperin Co., Inc., A. E., 75-87 Northampton St., Boston 18, Mass.
Hammermills, Inc., 625 "C" Ave. N.W., Cedar Rapids, Iowa
Hammond Bag & Paper Co., Wellsburg, W.Va.
Hankison Corp., College & Pike, Canonsburg, Pa.
HANKS, INC., ABBOTT A., 1300 SANSOME ST., SAN FRANCISCO 11, CALIF.
Hanover Industries, Inc., 77 Veteran St., Meriden, Conn.
Harbison-Walker Refractories Co., 307 5th Ave., Pittsburgh 22, Pa.
HARDINGE CO., INC., 240 ARCH ST., YORK, PA.
HARNISCHFEGER CORP., 4400 W. NATIONAL AVE., MILWAUKEE 46, WIS.
Harrison-Walker Refractories, 307-5th Ave., Pittsburgh 22, Pa.
Harsco Corp., Taylor-Wharton Co., Div., High Bridge, N.J.
Hathaway Instruments, Inc., Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.
Haver & Boecker, P.O. Box 163, Oelde, Westfalen, W. Germany
Havlick, J. L., 112 S. Cedar St., Spokane 4, Wash.
Hawley & Hawley Assayers & Chemists, Inc., P.O. Box 1060, Douglas, Ariz.
Hawthorne, Herb J. Inc., P.O. Box 7366, Houston 8, Tex.
Hazemag (Canada) Ltd.—see U.S.
Hazemag USA, Inc., 122 E. 42nd St., Rm. 3702A, New York 17, N.Y.
Heinrichs Geoexploration Co., P.O. Box 5671, Tucson, Ariz.
Hendrick Mfg. Co., Dundatt St., Carbondale, Pa.
Hensley Equipment Co., Inc., P.O. Box 637, San Leandro, Calif.
Hercules Galion Products, Inc., Galion, Ohio
Hercules Powder Co., 910 Market St., Wilmington 99, Del.
Hercules Steel Products Co., 500 Sherman St., Galion, Ohio
HEWITT-ROBINS, 666 GLENBROOK RD., STAMFORD, CONN.
HEWITT-ROBINS INC., HEWITT RUBBER DIV., 240 KENSINGTON AVE., BUFFALO 5, N.Y.
Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.
Hirsch Brothers Machinery Co., Inc., P.O. Box 226, 1901 Bassett Ave., El Paso, Tex.
Hitchcock Mfg. Co., 12015 Wicks St., Sun Valley, Calif.
Hobart Brothers Co., Hobart Sq., Troy, Ohio
Holman Bros. Ltd., Camborne, Cornwall, England
Homer Mfg. Div., The Ohio Electric Mfg. Co., 142 E. Pearl St., Lima, Ohio
Hose Accessories Co., Le-Hi Div., 17th & Lehigh Ave., Philadelphia 32, Pa.
Hose Accessories Co., Lehigh Ave. & 17th St., Philadelphia 32, Pa.
Hossfeld Mfg. Co., Rock Drill Div., 460-462 W. Third St., Winona, Minn.
Hostachem Corp., (U.S. Distributor for Knapsack-Griesheim, AG), 270 Sheffield St., Mountainside, N.J.
Hough Co., The Frank G., 982 7th St., Libertyville, Ill.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
HOUSTON TOOL CO., P.O. BOX 251, SANTA SUSANA, CALIF.
Howe Scale Co., Inc., Rutland, Vt.
Howell Electric Motors Co., 409 N. Roosevelt St., Howell, Mich.
Huber-Warco Co., 202 N. Greenwood St., Marion, Ohio
Hudson Ltd., Robert, P.O. Box 55, Leeds, England; Cable Raletrux
HUGHES TOOL CO., 5425 POLK AVE., HOUSTON 1, TEX.
HUMPHREYS ENGINEERING CO., 818 17TH ST., STE. 910, DENVER 2, COLO.
Hunting Geophysical Services, Inc., 57 Park Ave., New York 17, N.Y.
Hunting Technical & Exploration Services, Ltd., 57 Park Ave., New York 16, N.Y.
Hunting Survey Corp. Ltd., 1450 O'Connor Dr., Toronto 16, Canada
Hydraulic Supply Mfg. Co., 7500 8th Ave. So., Seattle 8, Wash.
Hyster Co., 2902 N.E. Clackamas St., Portland 8, Ore.

I

I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.
Ideal Industries, Inc., 1055 Park Ave., Sycamore, Ill.
Illinois Powder Mfg. Co., 506 Olive St., St. Louis, Mo.
Imperial Oil & Grease Co., Inc., 6505 Wilshire Blvd., Los Angeles 48, Calif.
Industrial Air Products Co., 3200 N.W. Yeon Ave., Portland 10, Ore.
Industrial Coupler Co., P.O. Box 1751, E. 4218 Boone Ave., Spokane, Wash.
Industrial Nucleonics Corp., 650 Ackerman Rd., Columbus 2, Ohio
INDUSTRIAL PHYSICS & ELECTRONICS CO., 470 S. 10TH E., SALT LAKE CITY 2, UTAH
Infilco, Inc., P.O. Box 5033, Tucson, Ariz.
INGERSOLL-RAND CO., 11 BROADWAY, NEW YORK 4, N.Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.
INSPIRATION CONSOLIDATED COPPER CO., SEE ORE BUYER'S SECTION
International Geophysics, Inc., 2500 West Coast Hwy., Newport, Calif.
Internat'l Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

International Minerals & Metals Corp., 11 Broadway, New York 4, N.Y.
INTERNATIONAL NICKEL CO. INC., 67 WALL ST., NEW YORK 5, N.Y.
INTERNAT'L SMELTING & REFINING CO., 818 KEARNS BLDG., SALT LAKE CITY, UTAH
Interstate Equip. Corp., 300 Mt. Lebanon Blvd., Pittsburgh, Pa.
Iowa Mfg. Co., Cedar Rapids, Iowa
Irwin—Sensenich Corp., P.O. Box 311, Irwin, Pa.
Isbell Construction Co., P.O. Box 2351, Reno, Nev.

J

Jaeger Machine Co., 550 W. Spring St., Columbus 16, Ohio
James Equipment, Inc., P.O. Box 454, 215 Bayway, Elizabeth, N.J.
Jeffrey Mfg. Co., 861 N. 4th St., Columbus 16, Ohio
Jet-Lube, Inc., 3093 N. California St. (P.O. Box 3126, Glenoaks Station), Burbank, Calif.
JOHNS-MANVILLE SALES CORP., 22 EAST 40TH ST., NEW YORK 16, N.Y.
Johnson, Herbert, 804 Franklin St., Clearwater, Fla.
Johnson Loading Supplies, G.R., 5027 Butterworth Rd., Mercer Island, Wash.
Johnson-March Corp., The, 3018 Market St., Philadelphia 4, Pa.
Johnston Pump Co., 3272 E. Foothill, Pasadena, Calif.
Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.
Joost Manufacturing Co., 742 Bancroft Way, Berkeley 10, Calif.
Jordan International Co., 444 Market St., San Francisco 11, Calif.
JOY MANUFACTURING CO., HENRY W. OLIVER BLDG., PITTSBURGH 22, PA.

K

KSB, Klein, Schanzlin & Becker, AG., Postfach 1460, Nurnberg, Germany
KW-Dart Truck Co., 1301 N. Manchester Trafficway, Kansas City 20, Mo.
Kaiser Aluminum & Chem. Corp., Refractories & Chem. Div., 300 Lakeside Dr., Oakland 12, Calif.
Kaiser Engineers, 300 Lakeside Dr., Oakland 12, Calif.
Kaiser Steel Corp., Kaiser Center, 300 Lakeside Dr., Oakland 12, Calif.
Ka-Mo Tools, Inc., 1845 S. 55 Ave., Cicero 50, Ill.
Kane, William G., 1645 Milam Bldg., San Antonio, Tex.
Kansas City Hay Press Co., 801 Woodswether Rd., Kansas City 5, Mo.
Katolight Corp., 1st Ave. & Chestnut St., Mankato, Minn.
C. P. Keegle, Engineers, 1721 S. 14th St., Las Vegas, Nev.
KEENEY, PAUL E. CO., 1125 S. E. GRAND AVE., PORTLAND 14, ORE.
KELLOGG EXPLORATION CO., 3301 N. MARENGO AVE., ALTADENA, CALIF.
Kellogg, M. W., Co., 711 3rd Ave., New York 17, N.Y.
Kelly Geophysical Services Inc., Sherwin F., 900 Market St., Wilmington, Del.
Kenco, P.O. Box 174, 10081 Carmen Rd., Cupertino, Calif.
Kennametal Inc., Chalybeate Springs Rd., Bedford, Pa.
Kennedy-Van Saun Mfg. & Eng. Corp., 405 Park Ave., New York 22, N.Y.
Kern Instruments, Inc., 120 Grand St., White Plains, N.Y.
Keuffel & Esser Co., 300 Adams St., Hoboken, 9, N.J.
Keystone Lubricating Co., 21st Clearfield & Lippincott Sts., Philadelphia 32, Pa.
Kidde & Co., Inc., Walter, 456 Main St., Belleville 9, N.J.
KLOECKNER-HUMBOLDT-DEUTZ AG—DIESEL ENERGY CORP., 82 BEAVER ST., NEW YORK 5, N.Y.
Knapsack-Griesheim AG—see Hostachem Corp. (U. S. Distb.)
Koebel Diamond Tool Co., 9456 Grinnell Ave., Detroit 13, Mich.
Koehring Co., 1701 W. Wisconsin Ave., Milwaukee 16, Wis.
Koehring Co., Kwik-Mix Co. Div., 235 W. Grand Ave., Port Washington, Wis.
Kohler Co., Kohler, Wis.
KOPPERS CO., WOLMAN PRES. DIV., 750 KOPPERS BLDG., PITTSBURGH 19, PA., USA
Kraloy-CH Emtrol Co., 402 W. Central Ave., Santa Ana, Calif.
Kugelfischer Georg Schafer & Co., Schweinfurt/Main, West Germany

L

L&M Radiator Service, 2401 First Ave., Hibbing, Minn.
LaBour Co., Inc., 1607 Sterling Ave., Elkhart, Ind.
LAKE SHORE INC., BOX 911, IRON MTN., MICH.
Lancashire Dynamo & Crypto Ltd., Trafford Park, Manchester 17, England
Landis Steel Co., Box 248, 116 West A St., Picher, Okla.
LaRoe Instruments Inc., 1709 E. Rockville Pike, Rockville, Md.
Laughlin Co., Thomas, 143 Fore St., Portland 6, Me.
LAYTON CO. INC., P.O. BOX 87A, 4749 S. WHITHALL AVE., CUDAHY, WIS.
Lead Lined Iron Pipe Co., 33 Broadway, Wakefield, Mass.
LEBUS INTERNATIONAL ENGINEERS, P.O. BOX 2352, LONGVIEW, TEX.
Lectromelt Furnace Div., McGraw Edison Co., P.O. Box 1257, Pittsburgh, Pa.
Ledeen Inc., 3350 N. Gilman Rd., El Monte, Calif.
Ledoux & Co., Inc., 359 Alfred Ave., Teaneck, N.J.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.
Lee Rubber & Tire Corp., Republic Rubber Div., 1410 Albert St., Youngstown, Ohio
Lehigh Safety Shoe Co., First & Minor Sts., Emmaus, Pa.
Lemaire Instruments, Tuba City, Ariz.
Le Roi Div., Westinghouse Airbrake Co., 3716 W. Wisconsin Ave., Milwaukee, Wis.
Lerch Brothers Inc., P.O. Box 810, Hibbing, Minn.
Leschen Wire Rope Div., H. K. Porter Co., 2727 Hamilton Ave., St. Louis 12, Mo.
LeTourneau-Westinghouse Co., 2301 N. Adams St., Peoria, Ill.
LIBU SHOVEL CO. AB, STOCKBYVAGEN 13, STOCKSUND, SWEDEN
Lietz Co., The A., 840 Post St., San Francisco 9, Calif.
Lima Electric Motor Co., Findlay Road, Lima, Ohio
LINATEX CORP. OF AMERICA, STAFFORD SPRINGS, CONN.
Lincoln Electric Co., The, 22801 St. Clair Ave., Cleveland 17, Ohio
Lincoln Engr. Co., Div. McNeil Machine & Engr. Co., 4010 Goodfellow Blvd., St. Louis 20, Mo.
Link-Belt Co., Dept. 61-WMD., 1700 Prudential Plaza, Chicago, Ill.
Link-Belt Speeder Corp., 1201 Sixth St., S.W., Cedar Rapids, Iowa
Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.
Liquid-Solid Separations Ltd., 2 Anderson St., London, S.W.3, England
Live Roller Mills Mfg. Co., 476 E. Twain St., Fresno, Calif.
Loesche Hartzerkleinerungs-u. Zement-maschinen K.G., Steinstrasse 18, Duessldorf, W. Germany
LOGAN ENGINEERING CO., 4901 W. LAWRENCE AVE., CHICAGO 30, ILL.
LONGYEAR CO., E. J., 76 SO. 8TH ST., MINNEAPOLIS 2, MINN.
LOOFBOUROW, R. L., 4032 QUEEN AVE., SO., MINNEAPOLIS 10, MINN.
LOTTRIDGE-THOMAS & ASSOC., 905 JUDGE BUILDING, SALT LAKE CITY 11, UTAH
Ludlow-Saylor Wire Cloth Co., 4333 W. Clayton Ave., St. Louis 10, Mo.
Lufkin Rule Co., 1730 Hess St., Saginaw, Mich.
Lug-All Co., 355 E. Lancaster, Haverford, Pa.
Lundberg Exploration, Ltd., 96 Eglinton Ave E., Toronto 12, Ontario, Canada
Lunkenheimer Co., The, Beekman St. & Waverly Ave., Cincinnati 14, Ohio
LURGI GmbH, Lurgihaus, Gervinsstrasse 17-19, Frankfurt am Main, West Germany

M

M-H Standard Corp., 515 Communipaw Ave., Jersey City 4, N.J.
M-R-S Mfg. Co., Flora, Miss.
Macafee & Co., 3105 Wilshire Blvd., Los Angeles 5, Calif.
Mace Co., The, 2763 Blake St., Denver 5, Colo.
MACHINERY CENTER INC., P.O. BOX 964, SALT LAKE CITY, UTAH
MACK TRUCKS, INC., EMPIRE STATE BLDG., NEW YORK 1, N.Y.
MacWhyte Wire Rope Co., 2998-14th Ave., Kenosha, Wis.
MADISON, FRANK J. COMPANY, 315 MONTGOMERY ST., ROOM 628, SAN FRANCISCO, CALIF.
MAGMA COPPER CO., SUPERIOR, ARIZ.
Magnetic Engineering & Mfg. Co., 851 Van Houten Ave., Clifton, N.J.
Magor Car Corp., 50 Church St., New York 7, N.Y.
Majac Inc., 23d St., Sharpsburg, Pittsburgh 15, Pa.
Mancha Storage Battery Locomotive Div., Goodman Mfg. Co., Halsted & 48th Pl., Chicago 9, Ill.
Mandrel Industries, Electro-Technical Labs., 5134 Glenmont Dr., Houston 36, Texas
Manitowoc Engineering Corp., South 16th St., Manitowoc, Wis.
Mannesmann Export GmbH, Thomasstrasse 6, Dusseldorf, Germany
Mannesmann-Meer AG Karmanns-Str. 29 Monchengladbach, West Germany
MARION POWER SHOVEL CO., P.O. BOX 505, MARION, OHIO
Marlin-Rockwell Corp., 402 Chandler St., Jamestown, N.Y.
Marlow Pumps, Div. of Bell & Gossett Co., P.O. Box 200, Midland Park, N.J.
Marmon-Herrington Co., Inc., 1511 W. Washington St., Indianapolis 7, Ind.
Martin, Black & Co. (Wire Ropes Ltd.), Speedwell Works, Coatbridge, Scotland
Martindale Electric Co., 1332 Hird Ave., Cleveland 7, Ohio
Matheson Co. Inc., The, P.O. Box 85, E. Rutherford, N.J.
Matheson, Coleman & Bell, Div. The Matheson Co. Inc., 2909 Highland Ave., Norwood 12, Ohio
Mayhew Machine & Supply Co., 4700 Scyene Rd., Dallas, Tex.
Mayo Tunnel & Mine Equipment, Box 1413, Lancaster, Pa.
McCauley Industrial Corp., 1840 Howell Ave., Dayton, Ohio
MCCLINTOCK CO., R. S., P.O. BOX 66, W. 418 2ND AVE., SPOKANE 10, WASH.
McCullough Equipment Co., 1022 East 12th St., Oakland, California
McDonald Drilling Co., T. J., 14408 St. Marys, Detroit 27, Mich.
McDowell Co., Wellman Engineering Co. Div., 113 St. Clair Ave. NW, Cleveland, Ohio
McGraw-Edison Co., Lectromelt Div., P.O. Box 1257, Pittsburgh 30, Pa.
McGraw-Edison Co., Thomas A. Edison Industries, Storage Battery Div., West Orange, N.J.
MCLANAHAN CORP., 200 WALL ST., HOLLIDAYSBURG, PA.
McNally Pittsburgh Mfg. Corp., Drawer D, Pittsburg, Kansas
Meissner Engineers Inc., 300 W. Washington St., Chicago 6, Ill.
Menardi & Co., 1222 E. Grand Ave., El Segundo, Calif.
Menlo Research Laboratory, P.O. Box 522, Menlo Park, Calif.
Merrick Scale Mfg. Co., 180 Autumn St., Passaic, N.J.
Metron Instrument Co., 432 Lincoln St., Denver, Colo.
Mexico Refractories Co., Coal & Love Sts., Mexico, Mo.
Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., Chicago & Spring Sts., Freeport, Ill.
Mill & Mine Supply, Inc., 505 Lander St., Seattle 4, Wash.
Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.
MINE & SMELTER SUPPLY CO., 3800 RACE ST., DENVER, COLO.
Minerec Corp., 120 Broadway, New York, N.Y.
Mineral Engineers, 520 E. 4th St., Salt Lake City 2, Utah
Minerals Engineering Co., 417 So. Hill St., Los Angeles 13, Calif.
Miners Foundry & Mfg. Co., 200 Spring St., Nevada City, Calif.
Mining & Geophysical Services, Ltd., 123 Victoria St., London S.W.1, England
Mining Progress, Inc., P.O. Box 3, Highland Mills, N.Y.
Minneapolis-Honeywell, Heiland Div., 130 E. 5th Ave., Denver 3, Colo.
Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Avenues, Philadelphia 44, Pa.
Minneapolis-Honeywell Regulator Co., Micro Switch Div., 11 W. Spring St., Freeport, Ill.
Minneapolis-Moline Co., P.O. Box 1050, Minneapolis 1, Minn.
Minnesota Mng. & Mfg. Co., Irvington Varnish & Insulator Div., 6 Argyle Terrace, Irvington 11, N.J.
Mission Manufacturing Co., P.O. Box 4209, Houston 14, Tex.
Mitchell, Miles J., 10 Santa Margarita Dr., San Rafael, Calif.
Mixermobile Mfrs. Inc., 8027 N.E. Killingsworth, Portland 20, Ore.
Mobile Drilling, Inc., 960 N. Pennsylvania St., Indianapolis 4, Ind.
Mona Industries, Inc., P.O. Box 1796, Paterson, N.J.
Monarch Equipment Co., 7850 Laurel Grove, North Hollywood, Calif.
Monroe Calculating Machine Co., 555 Mitchell St., Orange, N.J.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Monten-Forschung GmbH Jurgensplatz 44, Dusseldorf, West Germany
Morgardshammars Mek. Verkstads AB, Morgardshammars, Sweden
Morris Machine Works, 31 E. Genesee St., Baldwinsville, N.Y.
MORSE BROS. MACHINERY CO., 2900 BRIGHTON BLVD., DENVER, COLO.
Morse Chain Co., a Borg-Warner Industry, S. Aurora St., Ithaca, N.Y.
Mosebach Manufacturing Co., 1115 Arlington Ave., Pittsburgh 3, Pa.
Motoramic Inc., 2120 Market St., San Francisco 14, Calif., Subsid. of Svenska Motorborr AB
Motorola Communications & Electronics, Inc., 4501 W. Augusta Blvd., Chicago 51, Ill.

N

NAGLE PUMPS, INC., 1250 CENTER AVE., CHICAGO HEIGHTS, ILL.
Napco Industries Inc., Federal Motor Truck Div., 834 N. Seventh St., Minneapolis 11, Minn.

National Airoil Burner Co., 1284 E. Sedgley Ave., Philadelphia 34, Pa.
National Carbon Co., 60 E. 42nd St., N.Y. 17, N.Y.
National Filter Media Corp., 1717 Dixwell Ave., New Haven 14, Conn.
National Fuse & Powder Co., 3801 Delgany St., Denver 5, Colorado
NATIONAL IRON CO., 50TH AVE. W. & RAMSEY ST., DULUTH 7, MINN.
NATIONAL MALLEABLE & STEEL CASTINGS CO., 10600 QUINCY AVE., CLEVELAND 6, OHIO
NATIONAL MALLEABLE & STEEL CASTINGS CO., CAPITOL FOUNDRY DIV., PHOENIX, ARIZ.
National Mine Service Co., 1260 Maple St., Indiana, Pa.
National Supply Co., 2 Gateway Center, Pittsburgh 22, Pa.
National Tank & Pipe Co., 2301 N. Columbia Blvd., Portland 17, Ore.
National Tank & Pipe Dept., Simpson Engineered Wood Products Co., 2301 N. Columbia Blvd., Portland 17, Ore.
NAYLOR PIPE CO., 1242 E. 92ND ST., CHICAGO 19, ILL.
New York Air Brake Co., The, Aurora Pump Div. 619 Loucks St., Aurora, Ill.
Newport Industries Co., Div. of Heyden-Newport Chemical Corp., 342 Madison Ave., New York 17, N.Y.
Nice Ball Bearing Co., 30th & Hunting Park Ave., Philadelphia 40, Pa.
Nichols Engineering & Research Corp., 70 Pine St., New York 5, N.Y.
Nichols Laboratories, Inc., 160 S.W. Temple St., Salt Lake City 1, Utah
Nolan Co., The, Bowerston, Ohio, USA
NORDBERG MFG. CO., 3073 S. CHASE AVE., MILWAUKEE 1, WIS.
North American Refractories Co., 1012 Nat'l. City-E 6th St. Bldg., Cleveland 14, Ohio
Northern Blower Co., 6429 Barberton Ave., Cleveland 2, Ohio
Northwest Engineering Co., 135 S. LaSalle St., Chicago 3, Ill.
Norton Co., 1 New Bond St., Worcester 6, Mass.
Norwood Controls Unit, Detroit Controls Div. of American Standard, 934 Washington St., Norwood, Mass.
Nuclear-Chicago Corp., 333 E. Howard Ave., Des Plaines, Ill.
NUCLEAR CORP. OF AMERICA, 2 RICHWOOD PLACE, DENVILLE, N.J.
Nucleonic Corp. of America, 196 Degraw St., Brooklyn 31, N.Y.
Nybergs Mek. Verkstad, Edvard, Kiruna, Sweden

O

Ohio Brass Co., 380 North Main St., Mansfield, Ohio
Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio
Ohio Gear Co., 1333 E. 179th St., Cleveland 10, Ohio
Ohio Hoist Mfg. Co., 321 S. Beaver St., Lisbon, Ohio
Okonite Co., The, 220 Passaic St., Passaic, N.J.
Olin Mathieson Chemical Corp., East Alton, Ill.
Oliver Corp., 400 W. Madison St., Chicago 6, Ill.
Oliver Corp., A. B. Farquhar Div., 142 N. Duke St., York, Pa.
Ore & Chemical Corp., The, 80 Broad St., New York 4, N.Y.
Ortruc, Inc., 1441 N. Warson Rd., St. Louis 32, Mo.
Osborne Lab. Inc., Raymond G., 235 W. 27th, Los Angeles 7, Calif.
Osmose Wood Preserving Co. of America Inc., 980 Ellicott St., Buffalo 9, N.Y.
Owen Bucket Co., The, 6001 Breakwater Ave., Cleveland 2, Ohio
Oxy-Catalyst, Inc., Devon, Pa.

P

Pacific Car & Foundry Co., 4th & Factory, Renton, Wash.
Pacific Foundry & Metallurgical Co., 3100 19th St., San Francisco, Calif.
Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
PACIFIC PIPE CO., 401 FOLSOM ST., SAN FRANCISCO, CALIF.
Pacific States Steel Corp., 35124 Alvarado-Niles Rd., Union City, Calif.
Pacific Wire Rope Co., 1840 E. 15th St., Los Angeles 21, Calif.
Pack Manufacturing Co., P.O. Box 508, Logan, Utah
Page Engineering Co., Clearing Post Office, Chicago 38, Ill.
Parker Safety Equipment Co., 785 Lyons Ave., Irvington 11, N.J.
Peale, Rogers, 315 Montgomery St., San Francisco, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., 301 W. Ave. 26, Los Angeles 31, Calif.
Pendleton Woolen Mills, Washougal Branch, P.O. Box 655, Washougal, Wash.
Penn Machine Co., 106 Station St., Johnstown, Pa.
Pennsalt Chemicals Corp., Industrial Chemicals Div., 3 Penn Center, Philadelphia 2, Pa.
PENNSALT OF WASHINGTON, DIV. PENNSALT CHEM. CORP., 2901 TAYLOR WAY, TACOMA 2, WASH.
Pennsylvania Crusher Div., Bath Iron Works Corp., 323 S. Matlack St., West Chester, Pa.
Pennsylvania Drilling Co., Penndrill Mfg. Div., 1205 Chartiers Ave., Pittsburgh 20, Pa.
Perkins Ltd., F., Westwood Works, Peterborough, England
PETERSON FILTERS & ENGINEERING CO., 1949 S. 2ND WEST, P.O. BOX 606, SALT LAKE CITY 10, UTAH
Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill.
Pfaudler Permutit, Inc., Permutit Co. Div., 50 W. 44th St., New York, N.Y.
Phelps Dodge Refining Corp., 300 Park Ave., New York 22, N.Y.
Phelps Dodge Copper Prod. Corp., 300 Park Ave., New York, N.Y.
Philadelphia Gear Works, Inc., G-St. below Erie Ave. & G. St., Philadelphia 34, Pa.
Philadelphia Quartz Co., 11461 Public Ledger Bldg., Philadelphia 6, Pa.
Philips Electronics Instruments, 750 S. Fulton Ave., Mt. Vernon, N.Y.
Pick Laboratories, P.O. Box 67, Saratoga, Calif.
Pickard Industries, Inc., 423 S. 8th St., P.O. Box 538, Mt. Vernon, Ill.
Piggott Projects, 1057 Howard St., San Francisco, Calif.
Pierce, Roger V., 808 Newhouse Bldg., Salt Lake City 4, Utah
Pioneer Geochemical Surveys Inc., P.O. Box 384, Spokane 10, Wash.
Pitman Manufacturing Co., Garner Ave. & Duck Rd., Grandview, Mo.
PLANT-DOUGLASS, P.O. Box 155, Duluth 1, Minn.
Pleuger Unterwasserpumpen GmbH, Hamburg-Wandsbek, Friedric-Ebert-Damm 105, Germany
Poor & Co., Crusher Eng. Div., 400 Architects Bldg., Philadelphia, Pa.
Poor & Co., Inc., Pioneer Engineering Div., 3200 Como Ave., S.E., Minneapolis, Minn.
H. K. Porter Inc., 74 Foley St., Somerville 43, Mass.
Porter Co., Inc., H. K., Connors Steel Div., P.O. Box 118, Huntington 6, W. Va.
Porter Co., Inc., H. K., Forge & Fittings Div., W-S Fitting Works, P.O. Box 95, Roselle, N.J.
Porter Co., Inc., H. K., Leschen Wire Rope Div., 2727 Hamilton Ave., St. Louis, Mo.
Porter Co., Inc., H. K., National Electric Div., Porter Bldg., Pittsburgh 19, Pa.
Porter Co., Inc., H. K., Quaker Rubber Div., Tacony & Comly Sts., Philadelphia, Pa.
Porter Co., Inc., H. K., Thermoid Div., Porter Bldg., Pittsburgh 19, Pa.
Post Co., Frederick, 155 E. Ohio, Chicago, Ill.
Pulmosan Safety Equip. Corp., 644 Pacific St., Brooklyn 17, N.Y.
Pulva Corp., 604 High St., Perth Amboy, N.J.
Pyrometer Instrument Co., Inc., 92 Portland Ave., Bergenfield, N.J.

Q

Quaker Rubber Div., H. K. Porter Co., Tacony & Comly Sts., Philadelphia 24, Pa.
Quick-Way Truck Shovel Co., 2401 E. 40th Ave., Box 1800, Denver, Colo.

R

RAMSEY ENGINEERING CO., 1853 W. COUNTY RD. C., ST. PAUL 13, MINN.
Rankin Mfg. Co., 616 S. Marengo Ave., P.O. Box 631, Alhambra, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N.J.
Ray-O-Vac Co., Div. of Electric Storage Battery Co., 212 E. Washington Ave., Madison 10, Wis.
Ray-O-Vac Co., Wilson Products Div., 212 E. Washington Ave., Madison 10, Wis.
Realist Inc., David White Instruments Div., N93 W16288 Megal Dr., Menomonee Falls, Wis.
REED ENGINEERING, 620 S. INGLEWOOD AVE., INGLEWOOD 1, CALIF.
Reichdrill Div., Chicago Pneumatic Tool Co., 1439 Ash St., Terre Haute, Ind.
Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio
Remington Arms Co., Inc., 939 Barnum Ave., Bridgeport 2, Conn.
Republic Steel Corp., Republic Bldg., Cleveland 1, Ohio
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland, Ohio
Republic Steel Corp., Truscan Steel Div., Albert St., Youngstown 1, Ohio
Research Cottrell, Inc., P.O. Box 750, Bound Brook, N.J.
Resisto-Loy Co., Inc., 1251 Phillips Ave., S.W., Grand Rapids 7, Mich.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N.Y.
Revere Electric Mfg. Co., 7420 Lehigh Ave., Chicago (Niles) 48, Ill.
Reynolds-French & Co., 2318 Chas. Page Blvd., Tulsa 27, Okla.
Rhoads, J. E. & Sons, 2100 W. 11th St., Wilmington 99, Del.
RIBLET TRAMWAY CO., BOX 7, STA. A, SPOKANE, WASH.
Rice Pump & Machine Co., 400 Park St., Belgium, Wis.
Richardson Scale Co., 688 Van Houten Ave., Clifton, N.J.
Rick Helicopters, Inc., San Francisco International Airport, San Francisco 28, Calif.
Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, Ohio
Roberts & Schaefer Co., 130 N. Wells St., Chicago 6, Ill.
Robinson Clay Prod. Co., The, 65 W. State St., Akron 9, Ohio
Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Rodale Mfg. Co., Inc., 6th & Minor Sts., Emmaus, Pa.
ROEBLING'S SONS, JOHN A., DIV. OF COLORADO FUEL & IRON CORP., 640 S. BROAD ST., TRENTON 2, N.J.
Rogers Brothers Corp., 100 Orchard St., Albion, Pa.
Rogers Iron Works Co., 11th & Pearl Sts., Joplin, Mo.
Rohm & Haas Co., 222 W. Washington Sq., Philadelphia 5, Pa.
Rolls-Royce Ltd., Shrewsbury, England
Rome Cable Corp., Div. of Alcoa, Ridge 56, P.O. Box 71, Rome, N.Y.
Roots-Connersville Blower—see Dresser Industries
ROPE MASTER BLOCKS—see PAUL E. KEENEY
Rose Mfg. Co., 2700 West Barberry Place, Denver 4, Colo.
Ross Screen & Feeder Co., 100 Quimby St., Westfield, N.J.
Rost & Co., H., Balatros Works, Hamburg, Harburg, W. Germany
Rotolite Sales Corp., 328 Essex St., Stirling, N.J.
Round Chain Co.'s., Broadway & Chaincraft Rd., Cleveland 5, Ohio
Rover Co. Ltd., The, Solihall, Warwickshire, England
Rowell Mfg. Co.—see Advance Car Mover Co. Inc.
Russell Mfg. Co., The, Middletown, Conn.
Ruth Co., The, 1437 Blake St., Denver 2, Colo.
Ryerson, Joseph T. & Son, Inc., 16th & Rockwell Sts., Chicago 8, Ill.

S

Safety First Supply Co., 425 Magee St., Pittsburgh 19, Pa.
Sahara Oil Co., 920 Spruce St., St. Louis 2, Mo.
SALA MASKINFABRIKS, AB, SALA, SWEDEN
Salem Tool Co., 767 S. Ellsworth Ave., Salem, Ohio
Sandvik Steel Inc., 172 Nevins, Fairlawn, N.J.
Sanford-Day Corp., Box 1511, Knoxville, Tenn.
Sauerman Bros., Inc., 638 S. 28th Ave., Bellwood, Ill.
Schaefer & Associates, F. C., P.O. Box 54, Parral, Chihuahua, Mexico
Schaeffer Poidometer Co., 2828 Smallman St., Pittsburgh 22, Pa.
Scheidenhelm, F. W., 50 Church St., New York 7, N.Y.
Schield Bantam Co. Inc., Park St., Waverly, Iowa
SCHRAMM INC., 675 N. GARFIELD AVE., WEST CHESTER, PA.
Scott-Concentrators, P.O. Box 211, Fair Oaks, Calif.
Screen Equipment Co., Inc., Buffalo 25, N.Y.
SECURITY ENGINEERING DIV., DRESSER INDUSTRIES INC., P.O. BOX 13647, DALLAS, TEX.
Seismograph Service Corp., P.O. Box 1590, Tulsa, Okla.
Shaft & Development Mach. Co., 808 Newhouse Bldg., Salt Lake City, Utah
Sharples Chemicals Inc., 1100 Widener Bldg., Philadelphia 7, Pa.
Sheffield Hollow Drill Steel Co., Ltd., Carbrook Hollow Rolling Mills, Carbrook, Sheffield, England
Sheffield Steel Div., Armco Steel Corp., Sheffield Station, Kansas City 25, Mo.
Shell Oil Co., 100 Bush St., San Francisco 6, Calif.
Shepard Niles Crane & Hoist Corp., Schuyler Ave., Montour Falls, N.Y.
Sheppard Co. Inc., R. H., 101 Philadelphia St., Hanover, Pa.
Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.
Simplicity Engineering Co., 209 South Oak St., Durand 6, Mich.
Simpson Engineered Wood Prods. Co., National Tank & Pipe Dept., 2301 N. Columbia Blvd., Portland 17, Ore.
SKF Hellefors Jernverk, Hallefors, Sweden
SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 32, Pa.
SKF Industries Inc., Tyson Bearing Co. Div., Masillon, Ohio
SKOOKUM CO., INC., 8504 N. CRAWFORD ST., PORTLAND 3, ORE.
F. L. SMIDTH & CO., 1270 AVE. OF THE AMERICAS, NEW YORK 20, N.Y.
Smit & Co., Inc., Anton, 111 8th Ave., New York 11, N. Y.
J. K. Smit & Sons, Inc., Murray Hill, N.J.
Smith-Emery Co., 781 East Washington Blvd., Los Angeles 21, Calif.
Smith & Sons (Rodley) Ltd., Thomas, Crane & Excavator Works, Rodley, Leeds, England

Smith Engineering Works, 532 E. Capitol Drive., Milwaukee 12, Wis.
Smith Tool Co., P.O. Box 431, Compton, Calif.
Snap-Tite Inc., 201 Titusville Rd., Union City, Pa.
Socony-Vacuum Oil Co., 26 Broadway, New York 4, N.Y.
Solar Aircraft Co., 2200 Pacific Hwy., San Diego 12, Calif.
SOUTHWESTERN ENGINEERING CO., 4800 SANTA FE AVE., LOS ANGELES 58, CALIF.
SPANG & CO., P.O. BOX 751, BUTLER, PA.
Spencer Chemical Co., 610 Dwight Bldg., Kansas City, Mo.
Spencer-Safford Loadcraft, P.O. Box 548, Augusta, Kans.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
SPRAGUE & HENWOOD, INC., BOX 446, SCRANTON 2, PA.
Spraying Systems Co., 3201 Randolph St., Bellwood, Ill.
Square D Company, EC&M Div., 4500 Lee Rd., Cleveland 28, Ohio
Stanco Mfgs. & Sales, Inc., 1666 Ninth ST., Santa Monica, Calif.
Standard Electric Mfg. Co., Inc., Haddon Ave., West Berlin, N.J.
Standard Oil Co. of Calif. Western Operations, Inc., 225 Bush St., San Francisco, Calif.
Standard Oil Company (Indiana), 910 So. Michigan, Chicago, Ill.
Standard Steel Corp., 5031 Boyle Ave., Los Angeles 58, Calif.
Stanton & Son Inc., E. J., P.O. Box 3816 Terminal Annex, Los Angeles 54, Calif.
Staplex Co., The Air Sampler Div., 777 Fifth Ave., Brooklyn 32, N.Y.
Star Expansion Pacific, Inc., 142 Liberty St., New York 6, N.Y.
Star Wire Screen & Iron Works, Inc., 2515 San Fernando Road, Los Angeles 65, Calif.
Stauffer Chemical Co., Consolidated Chemical Industries Div., 636 California St., San Francisco 8, Calif., and 6910 Fannin St., Houston 25, Tex.
Stearns Magnetic Products Div., The Indiana General Corp., 635 S. 28th St., Milwaukee 46, Wis.
Stearns-Roger Mfg. Co., The, P.O. Box 5888, Denver, Colo.
Stenberg Corp. of Canada Ltd., 8230 Mayrand St., Montreal 9, Quebec, Canada
Stenberg Mfg. Corp., Hoosick Falls, N.Y.
Stephens-Adamson Mfg. Co., 13 Ridgeway Ave., Aurora, Ill.
Stewart-Warner Corp., Alemite Div., 1826 Diversey Parkway, Chicago 14, Ill.
STILL & STILL CONSULTING MNG. ENG. & GEO., P.O. BOX 1512, PRESCOTT, ARIZ.
W. H. Stonell & Co., 421 W. Sprague MA59, Spokane 4, Wash.
Stonhard Co. Inc., 401 N. Broad St., Philadelphia 8, Pa.
STOODY CO., P.O. BOX 901, WHITTIER, CALIF.
Stratoflex Inc., 220 Roberts Cutoff Rd., P.O. Box 10398, Ft. Worth 14, Tex.
Straub Mfg. Co. Inc., 8383 Baldwin St., Oakland 21, Calif.
Studebaker-Packard Corp., Onan Div., 2515 University Ave. S.E., Minneapolis, Minn.
Stulz-Sickles Co., 929-939 Port Ave., Elizabeth, N.J.
STURTEVANT MILL CO., 157 CLAYTON ST., DORCHESTER, BOSTON 22, MASS.
Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, Wis.
Swift & Co., Technical Products Dept., 1800 165th St., Hammond, Ind.
Syntron Co., 166 Lexington Ave., Homer City, Pa.

T

Technical Fabricators Inc., 136 Washington Ave., Nutley, N.J.
Telluride Iron Works Co., 400 Main Ave., Durango, Colo.
Tennant, C., Sons & Co., of N.Y., The Sink & Float Div., 100 Park Ave., New York 17, N.Y.
Tennessee Coal & Iron Div., U. S. Steel Corp., P.O. Box 599, Fairfield, Ala.
Texas Co., 135 E. 42nd St., New York 17, N.Y.
Texas Gulf Sulphur Co., Newgulf, Tex.
Texas Instruments, Inc., Industrial Products Group, 3609 Buffalo Speedway, Box 6027, Houston 6, Tex.
Textron Inc., Homelite Div., Riverdale Ave., Port Chester, N.Y.
Thew Shovel Co., The, 28th & Fulton St., Lorain, Ohio
Thomas Flexible Coupling Co., Main Ave. & Biddle St., Warren, Pa.
Thomas Laughlin Div., Amer. Hoist & Derrick Co., 145 Fore St., Portland 6, Maine
Thor Power Tool Co., 175 N. State St., Aurora, Ill.
Three Point Belt Lacing Inc., P.O. Box 38, Peace Dale, R.I.
Throwaway Bit Corp., 4200 N.W. Yeon Ave., Portland 10, Ore.
Tide Water Assoc. Oil Co., 17 Battery Place, New York 4, N.Y.
TIMKEN ROLLER BEARING CO., THE, 1835 DUEBER AVE., S.W., CANTON 6, OHIO
Toledo Scale Corp., Toledo Scale Div., 1042 Telegraph Rd., Toledo 12, Ohio
TOMCO Products Co., 5426 Schuhmacher Lane, Houston 27, Tex.
Tool Steel Gear & Pinion Co., 211 Township Ave., Elmwood Place, Cincinnati 16, Ohio
Torit Manufacturing Co., 1133 Rankin St., St. Paul 16, Minn.
Tracerlab Inc., 1601 Trapelo Rd., Waltham, Mass.
Tractomotive Corp., County Line Rd., Deerfield, Ill.
Traylor Engineering & Mfg. Div. of Fuller Co., Box 596, Allentown, Pa.
TREADWELL CO., INC., M. H., 140 CEDAR ST., NEW YORK 6, N.Y.
Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.
Trojan Powder Co., 17 N. 7th St., Allentown, Pa.
Trojan Powder Co., 620 Market St., San Francisco 4, Calif.
TROMBETTA SOLENOID CORP., 329 N. MILWAUKEE ST., MILWAUKEE 2, WIS.
Turner & Associates, Samuel F., 350 East Camelback Rd., Phoenix, Ariz.
Tweco Products Inc., P.O. Box 666, 1450 S. Mosely, Wichita 1, Kans.
Twedberg, Kleppe S.A., Av. Rio Branco, 25, P.O. Box 3144, Rio de Janeiro, Brazil
Twin Disc Clutch Co., 1328 Racine St., Racine, Wis.
Twining Laboratories, Inc., The, 2527 Fresno St., P.O. Box 1472, Fresno 21, Calif.
Tyler Co., The W. S., 3615 Superior Ave., Cleveland 14, Ohio

U

Uddeholm Co. of America, Inc., 155 E. 44th St., New York 17, N.Y.
Uhrden, Inc., 508 Grant St., Dennison, Ohio
Union Carbide Corp., National Carbon Co. Div., 270 Park Ave., New York 17, N.Y.
Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N.Y.
Union Carbide & Carbon Corp., Haynes Stellite Div., 725 S. Lindsay St., Kokomo, Ind.
Union Carbide & Carbon Corp., Linde Air Prod. Div., 30 E. 42nd St., New York 17, N.Y.
Union Iron Works, E. 217 Montgomery, Spokane, Wash.
Union Oil Co. of Calif., 617 W. 7th St., Los Angeles 17, Calif.
Union Wire Rope Corp., Subsid. of Armco Steel, 21st & Manchester Ave., Kansas City 26, Mo.
Unit Crane & Shovel Corp., 6411 W. Burnham St., Milwaukee 19, Wis.
Unit Rig & Equipment Co., Box 1889, Tulsa, Okla.
U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif.
U. S. Hoffman Machinery Corp., Industrial Equipment Divs., 103 4th Ave, New York 3, N.Y.
U. S. Instrument Corp., P.O. Box 1288 MW, Charlottesville, Va.
United States Rubber Co., 1230 Ave. of the Americas, New York 20, N.Y.
U. S. Smelting Furnace Co., East "A" St., & L&N Tracks, Belleville, Ill.
United States Safety Service Co., 1535 Walnut St., Kansas City 8, Mo.
U. S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.
U. S. Steel Corp., American Bridge Div., 525 Wm. Penn Place, Pittsburgh 30, Pa.
U. S. Steel Corp., American Steel & Wire Div., Rockefeller Bldg., Cleveland 13, Ohio
U. S. Steel Corp., Columbia-Geneva Steel Div., 120 Montgomery St., San Francisco 6, Calif.
U. S. Steel Corp., Oil Well Supply Div., Witte Engine Works, 1600 Oakland Ave., Kansas City 26, Mo.
Universal Dredge Mfg. Co., 124 Wazee Market, Denver 4, Colo.
Universal Engineering Corp., 625 C. Ave., N.W., Cedar Rapids, Iowa
Universal Road Machinery Co., 27 Emerick St., Kingston, N.Y.
Universal Transistor Products Corp., 36 Sylvester St., Westbury, N.J.
Universal Vibrating Screen Co., 1745 Deane Blvd., Racine, Wis.
Uranium Instruments Co., P.O. Box 1191, Grand Junction, Colo.

V

Van Waters & Rogers, Inc., Braun Chemical Div., 1363 S. Bonnie Beach Place, Los Angeles 54, Calif.
Van Waters & Rogers Inc., Braun-Knecht-Heimann-Co., 1400 16th St., San Francisco 18, Calif.
VAREL MFG. CO., 9230 DENTON DR., DALLAS, TEX.
VARIAN ASSOCIATES, 611 HANSEN WAY, PALO ALTO 29, CALIF.
Vascoloy-Ramet Corp., 800 Market St., Waukegan, Ill.
Victaulic Co. of America, Dept WM, P.O. Box 509, Elizabeth, N.J.
Vulcan Electric Co., 88 Holten St., Danvers, Mass.
VULCAN IRON WORKS CO., 2960 S. FOX ST., ENGLEWOOD, COLO.

W

Wadsworth Slec. Mfg. Co., Inc., Covington, Ky.
WAGNER MINING SCOOP INC., P.O. BOX 7676, 3616 N.E. 82ND AVE., PORTLAND, ORE.
Walsh Construction Co., P.O. Box 547, Oroville, Calif.
Walvoord, Inc., O. W., 301 Detroit St., Denver 6, Colo.
Walworth Co., 750 3rd Ave., New York 17, N.Y.
Ward Leonard Electric Co., 115 MacQuesten Parkway South, Mount Vernon, N.Y.
WARN MFG. CO., INC., BOX 6064, RIVERTON BR., SEATTLE 88, WASH.
Washington Iron Works, 1520 6th Ave. S., Seattle 4, Wash.
Washington Machinery Co., 7329 East Marginal Way, Seattle 8, Wash.
Waukesha Motor Co., West St. Paul Ave., Waukesha, Wis.
Wedge Wire Corp., Wellington, Ohio
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, Ohio
WEMCO—see Western Machinery Co.
West Chester Chemical Co., P.O. Box 39, West Chester, Pa.
Western Computing Consultants, Mining Div., P.O. Box 4096, Tucson, Ariz.
Western Consultants, Inc., Box 898, Casper, Wyo.
Western Gear Corp., P.O. Box 126, Belmont, Calif.
Western Insulated Wire Co., 2425 E. 30th St., Los Angels 58, Calif.
Western-Knapp Engr. Co., 650 5th St., San Francisco, Calif.
WESTERN MACHINERY CO., WEMCO Div., 650 5TH ST., SAN FRANCISCO 7, CALIF.
WESTERN PRECIPITATION DIV., JOY MFG. CO., 1000 W. 9TH ST., LOS ANGELES 54, CALIF.
WESTERN ROCK BIT MFG. CO., 552 W. 77TH SOUTH ST., SALT LAKE CITY 4, UTAH
Westfalische Union AG fur Eisen-und Drahtindustrie Wilhelmstr, 2, Hamm (Westf.) W. Germany
Westfall Equipment Co., 437 No. Columbia Blvd., Portland 17, Ore.
Westinghouse Air Brake Co., Cleveland Rock Drill Div., Cleveland, Ohio
Westinghouse Air Brake Co., Industrial Products Div., P.O. Box 36, Wilmerding, Pa.
Westinghouse Air Brake Co., Le Roi Div., Sidney, Ohio
Westinghouse Electric Corp., P.O. Box 2278, Pittsburgh 30, Pa.
Westinghouse Electric Corp., W. 58th St., Cleveland 2, Ohio
Westinghouse Electric Corp., Lamp Div., Bloomfield, N.J.
Westinghouse Electric Co., Sturtevant Div., Hyde Park, Boston 36, Mass.
Westvaco Chemical Div., Food Machinery & Chem. Corp., 161 E. 42nd St., New York 17, N.Y.
Wheelabrator Corp., 1407 S. Byrkit St., Mishawaka, Ind.
Wheel Trueing Tool Co., 3200 W. Davison Ave., Detroit 38, Mich.
White Motor Co., Autocar Div., Exton, Pa.
White Diesel Engine Div., White Motor Co., 1401 Sheridan Ave., Springfield, Ohio
Wild Heerbrugg Instruments, Inc., Main & Covert St., Port Washington, N.Y.
WILFLEY & SONS, INC., A. R., P.O. BOX 2330, DENVER 1, COLO.
Wilkinson Rubber Linatex Ltd., Camberley Surrey, England
Williams Patent Crusher & Pulverizer Co., 2701 N. Broadway, St. Louis 6, Mo.
Willys Motors, Inc., Toledo 1, Ohio
Wilson Exploration Co., 366 So. Fifth East, Salt Lake City 2, Utah
Windeler Co. Ltd., George, 2201 Jerrold Ave., San Francisco, Calif.
WINK CORP., F. W., 133 S. LINDEN AVE., SOUTH SAN FRANCISCO, CALIF.
Winslow Engineering & Mfg. Co., 4069 Hollis St., Oakland 8, Calif.
Winter-Weiss Co., The, 2201 Blake St., Denver 5, Colo.
Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 46, Wis.
WISSER & COX, 55 NEW MONTGOMERY ST., SAN FRANCISCO, CALIF.
WOLFE & ASSOCIATES, 6518 LEDBETTER ST., HOUSTON, TEX.
WOOD ASSAYING CO., THE HENRY, 733 W. COLFAX, DENVER 4, COLO.
Woodward & Dickerson, 1400 S. Penn Sq., Philadelphia 2, Pa.
World Mining Consultants, Inc., 220 Broadway, New York 38, N.Y.
World Wide Aerial Surveys (Aust.) Pty. Ltd., 52 Wentworth Ave., Mascot, Sydney, Australia
Worthington Corp., 421 Worthington Ave., Harrison, N.J.

XYZ

Yale & Towne Mfg. Co., Materials Handling Div., Wednesfield, Staffs, England
Yale & Towne Mfg. Co., The, Yale Materials Handling Div., 11000 Roosevelt Blvd., Philadelphia 15, Pa.
Youngstown Sheet & Tube Co., P.O. Box 900, Youngstown, Ohio
Yuba Consolidated Industries Inc., 1 Bush St., San Francisco 4, Calif.
Yuba Mining Div., Yuba Consolidated Industries, Inc., 675 East H. St., Benicia, Calif.
Zimmerman Manufacturing Co., Ephrata, Pa.

Index of Advertisers

Acker Drill Company, Inc. 133
AEG Allgemeine Elektricitats-Gesellschaft WM 37
(World Mining only)
Air Placement Equipment Co. 228
Alimak Corporation 19
Allen-Sherman Hoff Pump Co. 5
Alloy Steel & Metals Co. 94
American Brake Shoe Co. WM 44
(World Mining only)
American Brattice Cloth Corp. 133
American Cyanamid Company 7
American Manganese Steel Div.,
American Brake Shoe Co. 12
American Mine Door Co. 139
American Potash & Chemical Corp. 9
American Smelting & Refining Co. 223
American Zinc Sales Company 224
Asea Electric Company 33
Asea, Inc. WM 45
(World Mining only)
Atlas Copco AB WM 4, 5
(World Mining only)
Atlas Copco, Inc. 1
Aveling Barford WM 1
(World Mining only)

Barber-Webb Co., The 100
Bean Div., FMC, John 137
Bedford & Son, John WM 155
(World Mining only)
Black's Mining Equipment Ltd. WM 101
(World Mining only)
Bayles Bros. Drilling Co. Ltd. 63
Bayles Bros. Drilling Co. 97
Boulder Scientific Co. 106
B. R. D. Company, Ltd. WM 153
(World Mining only)
British LaBour Pump Co. Ltd. WM 87
(World Mining only)
British Ropeway Engineering Co. WM 154
(World Mining only)
Bullard Company, E. D. WM 42
(World Mining only)
Bunker Hill Company 224

Card Iron Works, C. S. 209
CEAG WM 97
(World Mining only)
Chicago Pneumatic Tool Co. 32
Clark Equipment International, C. A. WM 6, 7
(World Mining only)
Coast Mfg. & Supply Co. 227
Coates Steel Products Co. 21
Coeur d'Alenes Co., The 226
Coleman Cable & Wire Co. 228
Colorado Fuel & Iron Corp. 195-198
Columbia Steel Castings Co., Inc. 93

de Fries GmbH, Heinrich WM 152
(World Mining only)
de Sousa Co., Inc., J. E. 222
Deister Concentrator Co., Inc. 210
Denver Equipment Co. Inside Back Cover
Diamond Tool Research Co. 94
Diesel Energy Corp. 92
Dinglerwerke Aktiengesellschaft WM 13
(World Mining only)
Dorr-Oliver, Inc. 206, 207
Dow Chemical International Ltd., S. A. WM 40
(World Mining only)
Dowty Mining Equipment Ltd. WM 79
(World Mining only)
Dresser Industries, Inc.,
Security Engineering Div. 208

Edwards Company, E. H. WM 48
(World Mining only)
Elmco Corporation WM 136
(World Mining only)
Eisenhutte Prinz Rudolph WM 98
(World Mining only)
Electric Storage Battery Co. 218
Ellicott Machine Corp. 217
English Electric WM 2
(World Mining only)
Equipment Engineers 135
Euclid Division, General Motors Corp. 2
Euclid Division,
General Motors Overseas Operations WM 21
(World Mining only)

Fagersta Brucks WM 86
(World Mining only)
Farbwerke Hoechst A.G. WM 32
(World Mining only)
Faun-Werke Nuernberg WM 18
(World Mining only)
Flottmann-Werke, GmbH WM 20
(World Mining only)

Gardner-Denver Company 8
General Cable Corp. 4
General Electric Co. Ltd. WM 24
(World Mining only)
General Motors Corp., Euclid Division 2
General Motors Overseas Operations,
Electro-Motive WM 33
(World Mining only)
General Motors Overseas Operations,
Euclid Div. WM 21
(World Mining only)
General Motors Overseas Operations,
Power & Industrial Diesel WM 45
(World Mining only)
Getman Brothers 129
Goodall Rubber Co. 204, 205
Goodrich Co. International, B. F. WM 38
(World Mining only)
Goodyear International Corp. WM 80-81
(World Mining only)
Grace & Company, W. R. 229
Griphoist, Inc. 225
Gruendler Crusher & Pulverizer Co. 142

Hardinge Company 114, 115
Harnischfeger Corp. 26, 27
Hazemag WM 132
(World Mining only)
Head Wrightson Stockton Ltd. WM 8, 9
(World Mining only)
Helmets, Ltd. WM 100
(World Mining only)
Hewitt-Robins 14, 15
Houston Tool Company 225
Hudson Ltd., Robert WM 113
(World Mining only)
Hughes Tool Company 6
Humphreys Engineering 220

Industrial Physics & Electronics Co. 98
Ingersoll-Rand Company 25
Inspiration Consolidated Copper Co. 224
International Nickel Company, Inc. 17
International Smelting & Refining Co. 224

Johns Manville Corp., Transite Pipe Division 128
Joy Manufacturing Company 211

Keeney Co., Paul E. 130
Kennametal, Inc. WM 140
(World Mining only)
Klockner-Humboldt-Deutz AG WM 160
(World Mining only)
Koppers Company 104
K-W Dart Truck Company WM 17
(World Mining only)

Lake Shore, Inc. 90
Landsverk AB WM 47
(World Mining only)
LeBus International Engineers 117
LeTourneau-Westinghouse Co. WM 28, 29
(World Mining only)
Linatex Corp. of America 143
Logan Engineering Co. 122
Longyear Company, E. J. 146
Lurgi Verwaltung GmbH WM 119
(World Mining only)

Machinery Center, Inc. 105
Mack Trucks, Inc. 22
Madison Company, Frank J. 28
Magma Copper Company 222
Marion Power Shovel Co. 18
Mayo Tunnel & Mine Equipment WM 158
(World Mining only)
McLanahan Corp. 11
Mine & Smelter Supply Co. 200, 201
Mine Safety Appliances WM 25
(World Mining only)
Mining Engineering Co. Ltd., The WM 95
(World Mining only)
Mining Transportation Company WM 153
(World Mining only)
Mirrlees, Bickerton & Day Ltd. WM 121
(World Mining only)

Nagle Pumps, Inc. 122
National Filter Media Corp. 91
National Iron Company 23
National Malleable & Steel Castings Co. 29, 214
Naylor Pipe Company 199
Nordberg Manufacturing Co. 30, 31
Nordiska Maskinfilt AB WM 125
(World Mining only)
Nuclear Corp. of America 119
Nybergs Mekaniska Verkstad, Edward WM 154
(World Mining only)

Ore-Bee Mills, Inc. 229
Orenstein-Koppel Lusebecker
Maschinenbau WM 150
(World Mining only)
Oskar Maasberg WM 129
(World Mining only)

Pacific Pipe Company 107
Pennsalt of Washington,
Div. of Pennsalt Chemicals Corp. 102
Peterson Filters & Engineering Co. 202, 203
Plant-Douglass 105

Ramsay Engineering Company 123
Rankin Manufacturing WM 156
(World Mining only)
Ransomes & Rapier Ltd. WM 26
(World Mining only)
Reliance Rope 143
Riblet Tramway Company 217
Roebling's Sons Div., John A. 24
Rolls Royce Ltd., Shrewsbury WM 34
(World Mining only)
Rubber Improvements Ltd. WM 43
(World Mining only)

Sala Maskinfabriks AB 67
Salzgitter Maschinen AG WM 51
(World Mining only)
Schramm, Inc. 213
Security Engineering Div.,
Dresser Industries, Inc. 208
Sentinel (Shrewsbury) Ltd. WM 34
(World Mining only)
Sheffield Div., Armco Steel Corp. WM 85
(World Mining only)
Skinningrove Iron Co. Ltd. WM 114
(World Mining only)
Skookum Co., Inc., The 105
Smidth & Co., F. L. 53
Smit & Co., Anton WM 157
(World Mining only)
Southwestern Engineering Co. 108
Spang & Company 134
Sprague & Henwood, Inc. 20
Standard Steel Corp. 129
Stearns-Roger Mfg. Co. 64
Stoody Company 230
Sturtevant Mill Company 215
Svenska Diamantbergborrnings AB WM 130
(World Mining only)

Taylor & Sons Ltd., F. WM 99
(World Mining only)
Thor Power Tool Company WM 138, 139
(World Mining only)
Timken Roller Bearing Co. 13
Tool Steel Gear & Pinion Co. WM 134, 135
(World Mining only)
Treadwell Company, Inc., M. H. 16
Trombetta Solenoid Corp. 118
Turmag WM 111
(World Mining only)
Turner Brothers Asbestos Co. Ltd. WM 124
(World Mining only)

U. S. Foundries 227
U. S. Rubber International WM 110
(World Mining only)
United States Steel Co. WM 46
(World Mining only)

Varel Mfg. Co. 144
Varian Associates 10
Vulcan Iron Works Co. 95

Wagner Mining Scoop Co. 124
Warn Mfg. Co. 103
Wedag WM 41
(World Mining only)
Western Machinery Company Inside Front Cover
Western Precipitation Corp. 212
Western Rock Bit Mfg. Co. 131
Whitecross Co. Ltd. WM 113
(World Mining only)
Wilfley & Sons, Inc., A. R. Outside Back Cover

MARKET PLACE

Katica, George F. 218
Machinery Center, Inc. 216
Morse Bros. Machinery Co. 217
Pacific American Commercial Co. 217
Pressey & Son 218
Wade, W. R. 218

PROFESSIONAL DIRECTORY

Arizona Testing Laboratories 219
Bennetts Chemical Laboratory, Inc. 219
Boulder Scientific Company 219
Chapman, Wood & Griswold 219
Colorado Assaying Company 219
Cooke, Everett & Associates 219
Cowin & Company 219
Diamond Drill Contracting Company 219
Geodynamics, Inc. 219
Hanks, Inc., Abbot A. 219
Kellogg Exploration Co. 219
Longyear Company, E. J. 219
Loofbourow, R. L. 219
Lottridge-Thomas & Associates 219
MacAfee, Merrill W. 219
McClintock Company, R. S. 219
Newman, George H. 219
Reed Engineering 219
Still & Still 219
Wilson, L. Kenneth 219
Wink Corporation 219
Wisser & Cox 219
Wood Assaying Company, Henry E. 219

R. W. FLAGG, Chief Metallurgist, Ore Testing Division

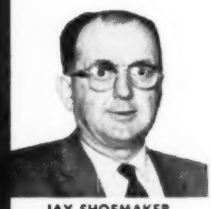
Formerly Research Dev. Engineer and Metallurgist for Dorr-Oliver; Metallurgist, Miami Copper, Miami, Ariz.; Met. E., Univ. of Ariz. College of Mines, 1945.

FRANK A. SEETON, Manager, Metallurgical Operations Division

Formerly Field Engineer and Asst. Director, Denver Ore Testing Division and Manager of mining and milling operations for Colorado Oil and Gas Corp.; Metallurgist, author and consultant; E. M., Colo. School of Mines.

CLARENCE THOM, Consultant

25 years Director of Denver Ore Testing Div.; pioneered in development of flotation method of lead-zinc treatment and other ore beneficiation processes now considered standard; consultant and author of numerous articles. Graduate, Whitman College, Walla Walla, Wash.



JAY SHOEMAKER, Field Service Engineer

More than 35 years of experience in operating, managing and trouble-shooting in metallic and non-metallic preparation plants.

Announcing...

METALLURGICAL OPERATIONS DIVISION

...providing field service on a world-wide scale

To widen its service to the mineral processing industry, Denver Equipment Company now offers the services of an expanded staff of qualified, experienced metallurgists, field service engineers and consultants.

We consider these men to be among the best in the industry and all are available to you for help with your processing problems...with your equipment or your plant ...anywhere in the world.

SERVICES PROVIDED BY THIS EXPANDED DIVISION

IMPROVED ORE TESTING METHODS AND FACILITIES
PILOT PLANT TESTS • UNIT DESIGN
FLOWSHEET IMPROVEMENT • DEPENDABLE REPORTS
CONSULTATION • EQUIPMENT INSTALLATION
TROUBLE-SHOOTING • START-UP SERVICE

These Engineers are here to help you. For assistance write us about your processing problems.

ALVA GARRETT, Consultant

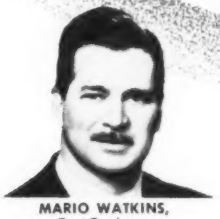
Over 50 years experience in mining and milling. With Denver Equip. Co. since 1930 as Field Engineer with world-wide experience in mill construction.

BILL WENTWORTH, Service Engineer

More than 20 years of experience in milling with extensive experience in foreign countries.

DELL LITZ, Chemical Analyst

16 years in the Copper Belt, Northern Rhodesia; Metallurgical Supt., Roan Antelope Copper Mines, Ltd.; Smelter Supt., Mufulira Copper Mines, Ltd.; E. M., Colo. School of Mines.



MARIO WATKINS, Test Engineer

Graduate Chemical Engineer; Plant Supt., Dominion Sulphate and Camsa Co., Argentina; Mining Dept., Ind. Bank, Buenos Aires; Instructor; Mining Construction Advisor, Gama Company.

HENRY C. HURD, JR., Project Engineer

With Denver Ore Testing Div. since 1946; Met. E., Colorado School of Mines. Specializes in process development.

STEVE ILITCH, Test Engineer

B. Sc., Belgrade Univ., 1925; Chemical research, Zagreb and London Univ.; Chief Chemist, Trepca Mines; Chemist, Uruwira Minerals; Instructor, Provincial Inst. of Mining, Haileybury, Ont., Canada.

"The firm that makes its friends happier, healthier and wealthier"

DENVER

Steel-Head Mills

"Sub-A" Flotation

Agitators

Diaphragm Pumps

Automatic Samplers

SRL Pumps

Complete Mineral Processing Equipment

DENVER EQUIPMENT COMPANY 1400 17TH ST. • DENVER 17, COLO. • CABLE DECO DENVER • PHONE CHerry 4-4466

BRANCH OFFICES: NEW YORK CITY, 4114 Empire State Bldg., Phone CH 4-6510 • BLUEFIELD, W. VA., P. O. Box 1536, Phone DAvenport 5-6598 • TORONTO, 185 Bay St., Phone EMpire 3-8836 • VANCOUVER, 207 Credit Foncier Bldg., Phone MUtual 3-4826 • LONDON, 15-17 Christopher St., Finsbury Sq., Phone Bishopsgate 0636 • JOHANNESBURG, Broadway and Ninth, Paz Valley, Phone 25-7531 • LIMA, Maquinarias 270, Casilla 4950, Phone 41887 • MEXICO CITY, Avenida Juarez 14, Desp. 615, Phone 21-1477.

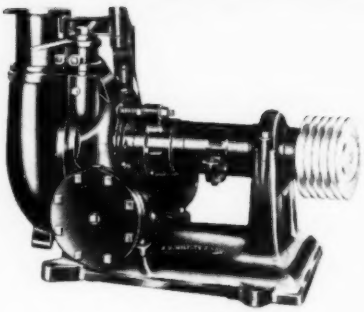
DEALERS: CHARLESTON, SO. CAR., Southern Corp. • CLEVELAND, OHIO, Telco, Inc. • HIBBING, MINN., Jasper Engineering & Equip. Co. • HOUSTON, TEX., Whelan-May Co. • ISHPEMING, MICH., Charter, Inc. • JERSEY CITY, N. J., Chemical Pump & Equip. Corp. • KELLOGG, IDA., Siler Equip. Sales • MULBERRY, FLA., R. H. Clark Equip. Co. • PORTLAND, ORE., Pump Pipe & Power Co. • SAN FRANCISCO, CALIF., J. A. Nissen • ANTOFAGASTA, CHILE, International Mach. Co. • SANTIAGO, CHILE, Cia. Electro-Metalurgica, S. A., International Mach. Co. • LA PAZ, BOLIVIA, International Mach. Co • ORURO, BOLIVIA, International Mach. Co. • BANGKOK, THAILAND, Henry Waugh & Co., Ltd. • FORT BOMBAY, INDIA, Pioneer Equip. Co. (Pvt) Ltd. • MANILA, P. I., Manila Mach. & Supply Co., Inc. • OSAKA, JAPAN, Kurimoto Iron Works, Ltd. • SINGAPORE, MALAYA, Henry Waugh & Co., Ltd. • CASABLANCA, MOROCCO, Ste. Miniere et Metallurgique • DAR-ES SALAAM, TANGANYIKA, Gailey & Roberts, Ltd. • NAIROBI, KENYA COLONY, Gailey & Roberts, Ltd., • FRANCE, Barbier, Benard & Turene • MADRID, SPAIN, Suministros "Shag" S. A. • TURIN ITALY, Ing. Giulio Axerio. • GLEBE, NEW SO. WALES, AUSTRALIA, A. E. Goodwin, Ltd.

WILFLEY centrifugal PUMPS

CENTRIFUGAL WILFLEY PUMPS

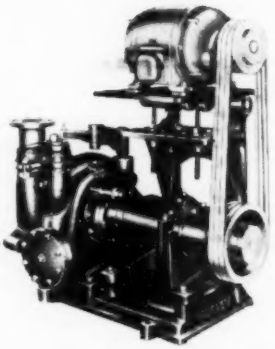
INDIVIDUAL ENGINEERING ON EVERY INSTALLATION

The new patented **WILFLEY MODEL "K"** centrifugal sand pumps are designed for maintained high efficiency in rugged service and trouble-free operation. They combine the original WILFLEY principles with new improvements developed through years of engineering experience.



BELT DRIVEN, overhead V-belt driven and direct driven WILFLEY Model "K" pumps available in 1", 1½", 2", 2½", 3", 4", 5", 6", 8", 10" discharge sizes with capacities to 4000 GPM and heads as high as 200'.

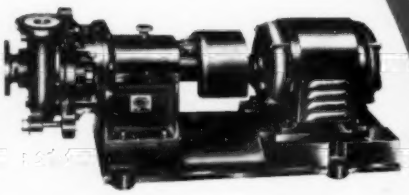
WILFLEY SAND PUMPS may be fitted with interchangeable electric furnace alloy irons, rubber covered wear parts, special application alloys and synthetic elastomers to best meet the requirements of each pumping installation. The WILFLEY wear part design is ideal for rubber covering as ample clearance around the runner assures a practical and dependable rubber lined pump. Wherever you have a solids transfer job specify the WILFLEY Model "K" sand pump — for continuous, trouble-free performance, simple installation and stepped-up production.



Wilfley Sand Pump
"COMPANIONS IN ECONOMICAL OPERATION"
Wilfley Acid Pump

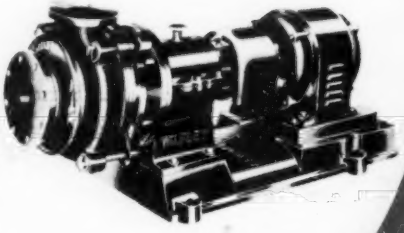
For Acids, Corrosives, Hot Liquids & Mild Abrasives

The new **WILFLEY MODEL "AF"** acid pump is famous for efficiency and dependability. Actual production-line records show worthwhile dollar savings in stepped-up performance and low-cost operation. Every day, in modern chemical plants the world over, WILFLEY Acid Pumps move hard-to-handle solutions on a trouble-free, round-the-clock schedule. Available in 10 to 3,000 GPM capacities with heads from 15 to 200' and higher.



WILFLEY PACKINGLESS Acid Pump is available with wetted pump parts of any machinable alloy as well as plastics. This versatility of materials, as well as rugged heavy-duty construction and sound mechanical design, combine with the unique WILFLEY principles to make this an ideal pump for any corrosive service.

A completely steam jacketed assembly with multiple steam connections is available for any solution which freezes above ambient temperatures.



Let our engineers solve your pumping problems.

SOLE LICENSEES AND MANUFACTURERS

EASTERN CANADA,
Canadian Vickers, Ltd.,
Montreal, Que., Canada.

WESTERN CANADA,
Manitoba Bridge
& Iron Works, Ltd.,
Winnipeg, Man., Canada.

SOUTH AFRICA
E. L. Bateman, Ltd.
Founders Building
34 Ameshoff Street
Braamfontein, Johannesburg

ENGLAND
Dorr Oliver Co., Ltd.,
Norfolk House
Wellesley Road, Croydon,
Surrey, England

FRANCE
Dorr-Oliver S. N. a R. L.
8 Rue Bellini,
Paris 16, France

THE NETHERLANDS
Dorr-Oliver N. V.
Apollolaan
153, Amsterdam Z, Holland

A. R. WILFLEY and SONS, INC.

DENVER, COLORADO, U. S. A. P.O. BOX 2330 · NEW YORK OFFICE: 122 EAST 42ND STREET, NEW YORK CITY 17